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MASTER'S THESIS

PROHIBITED WEAPONS IN INTERNATIONAL LAW AND AIR FORCE IMPLICATIONS

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ABSTRACT

Master's Thesis

Prohibited Weapons in International Law and Air Force Implications

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In my study, the implications of prohibited or restricted weapons in international law are examined in the field of international relations with their applications in air forces. The law of weaponry has an important place as a sub-branch of international humanitarian law or the law of war as part of international relations and international law. Contemporary international organizations, non-governmental organizations, world public and states are more sensitive towards the implementations of the humanitarian law or the law of armed conflict (LOAC) compared to a century ago.

The law of weaponry has progressed significantly through the development of weapon technology, the introduction of new concepts of LOAC and the adoption of the universal principles for the St. Petersburg Declaration. Because of the increasing use of air power in armed conflicts and its decisive role in the outcome of the wars, the bound and interaction between the law of weaponry and the concept of air power is more apparent. The disregard of law of weaponry by the air forces can cause issues of judicial, political, and humanitarian in both international and national arenas. It is a good example that the ignorance of the law of weaponry and armed conflict by the USA during the Vietnam War and its violations and the resulting wide media coverage caused the change of the US war policy.

Particularly, significant progress has been made in the law of weaponry since the second half of the 20th century. The chemical and biological weapons are strictly prohibited and almost all of the states signed and ratified the Conventions. In a possible use of weapons of mass destruction in the conflicts, even international intervention can come into the agenda. Concerning with conventional weapons, the prohibition of the anti-personnel landmines and cluster bombs should be considered as two most important steps. Today and in the future, the use of DU munitions, Unmanned Aerial & Combat Vehicles, Cyber War and Autonomous Weapon systems with Nanotechnology, which are all subjects of the law of weaponry, have created concerns in terms of humanitarian law. In conclusion, the implications of humanitarian, international politics, and international law of use of air power are evaluated on the basis of the law of weaponry in this study.

Keywords: Law of Weaponry, Conventions, Military Necessity, Indiscriminate Attack, Conventional Weapons, Weapons of Mass Destruction

ÖZET

Yüksek Lisans Tezi

Uluslararası Hukukta Yasaklanan Silahlar ve Hava Kuvvetleri Çıkarımları

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Bu çalışmada uluslararası hukukta yasaklanan veya kısıtlanan silahlar ile Hava Kuvvetleri uygulamalarının uluslararası ilişkiler alanı açısından çıkarımları incelenecektir. Silah hukuku, insancıl hukukun ya da savaş hukukunun bir alt dalı olarak uluslararası ilişkiler ve uluslararası hukuk alanında önemli yere sahiptir. Günümüzde uluslararası örgütler, sivil toplum kuruluşları, dünya kamuoyu ve devletler, insancıl hukuk ve ya savaş hukukunun uygulanması konusunda bir yüzyıl öncesine göre daha fazla hassasiyet göstermektedir.

Uluslararası silah hukuku; St. Petersburg Deklarasyonundan bu yana silah teknolojilerinin gelişimi, insancıl hukukta yeni kavramlarında ortaya konulması ve evrensel ilkeler olarak kabul edilmesiyle çok önemli ilerlemeler kaydetmiştir. Silah hukukuna paralel olarak hava gücünün silahlı çatışmalarda artan oranda kullanılması ve bunun sonucu olarak savaşın neticesinde belirleyici rolünün giderek artması, silah hukuku ve hava gücü kavramları arasında, bağlayıcı ve karşılıklı etkileşim içeren bir durum yaratmaktadır. Silah hukukunun hava kuvvetleri tarafından göz ardı edilmesi hem uluslararası hem de ulusal boyutta hukuki, politik ve insani sonuçlar doğurabilmektedir. ABD'nin Vietnam savaşı sırasında silah ve çatışma hukukunun göz ardı etmesi ve yaşanan ihlallerin medya da yayınlanarak yankı bulması savaş siyasetini değiştirmesine neden olması bunun en başlıca örneklerinden biridir.

Özellikle 20'nci yüzyılın ikinci yarısından itibaren silah hukukunda önemli ilerlemeler kaydedilmiştir. Kimyasal ve biyolojik silahlar tamamen yasaklanmış hemen hemen tüm devletler bu yasaklama konvansiyonlarını imzalamış ve onaylamıştır. Hatta kitle imha silahlarının çatışmalarda kullanılması durumunda uluslararası müdahale dahi gündeme gelebilmektedir. Konvansiyonel silahlarla ilgili olarak anti-personel mayınları ile demet bombalarının yasaklanması en önemli iki adım olarak değerlendirilmelidir. Günümüzde ve gelecekte silah hukuku boyutunda kullanımları tartışma konusu olan DU mühimmatlar, silahlı insansız hava araçları, siber savaş ve otonom silah sistemleri ile nano-teknoloji uygulamalarının kullanımı insancıl hukuk boyutunda endişe yaratmaktadır. Bu çalışmada son olarak silah hukuku temel alınarak hava gücü kullanımının insani, uluslararası politik ve uluslararası hukuk çıkarımları değerlendirilmiştir.

Anahtar Kelimeler: Silah Hukuku, Konvansiyonlar, Askeri Gereklilik, Hedef Gözetmeyen Saldırı, Konvansiyonel Silahlar, Kitle İmha Silahları

PROHIBITED WEAPONS IN INTERNATIONAL LAW AND AIR FORCE IMPLICATIONS

CONTENTS

CHAPTER III

PROHIBITED WEAPONS

ABBREVIATIONS

AP I	Additional Protocol I
APL	Anti-Personnel Landmines
AWS	Autonomous Weapon System
BWC	Biological Weapons Convention
CEM	Combined-Effects Munition
CEP	Circular Error Probable
CCDCOE	The Cooperative Cyber Defense Centre of Excellence
CCW	Certain Conventional Weapons Convention
CIA	Central Intelligence Agency
CWC	Chemical Weapons Convention
DIME	Dense Inert Metal Explosive
DU	Depleted Uranium
ECHR	European Court of Human Rights
EOD	Explosive Ordnance Disposal
ENMOD	Environmental Modification Convention
ERW	Explosive Remnants of War
FAE	Fuel-air Explosive
FARC	Colombian Revolutionary Armed Forces
GPS	Global Positioning System
GBU	Guided Bomb Unit
HRW	Human Rights Watch
IACHAR	Inter-American Court of Human Rights
ICC	International Criminal Court

ICJ	International Court of Justice
ICRC	International Committee of Red Cross
ICTY	International Criminal Tribunal for the former Yugoslavia
IDF	Israel Defense Force
IEAE	The International Atomic Energy Agency
IED	Improvised Explosive Device
LOAC	The Law of the Armed Conflict
NATO	North Atlantic Treaty Organization
NGO	Nongovernmental Organizations
NPT	Nuclear Non-Proliferation Treaty
OPCW	Organization of the Prohibition Chemical Weapons
POW	Prisoners of War
RCA	Riot Control Agent
UAV	Unmanned Aerial Vehicles
UCAV	Unmanned Combat Vehicles
UN	United Nations
UNEP	The United Nations Environment Programme
UNIDIR	The United Nations Institute for Disarmament Research
UNOG	United Nations Office at Geneva
USAF	United States Air Force
UXO	Unexploded Ordnance
WMD	Weapons of Mass Destruction
WHO	World Health Organization

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INTRODUCTION

This thesis mainly aims to explain the relationship between the law of weaponry and the applications of air force concerning foreign policy. The international humanitarian law or the law of the conflict (LOAC) is one of the main branches of the international law. Particularly, the law of armed conflict (LOAC) had influenced the international community for two centuries. With the industrial revolution, military technology became more destructive and lethal. Due to this reason, the regulation of the law weaponry as a universal law was needed by the modern states in the 19th century. Besides conventional weapons, the first example of the weapons of mass destruction is chemical weapons firstly used in the Great War in which they caused the death and injury of over hundreds of thousands of people. After 30 years, humanity faced the most devastating and frightening weapons in history. The first nuclear weapon or atomic bomb was dropped on the Hiroshima and Nagasaki on 6 and 9 August of 1945. A hundred thousand of innocent people were killed instantly because of atomic explosion. After the Second World War, the principles of human rights and democracy began to dominate and influence the newly constituted world order. The international communities including INGO's, institutions, states, and societies have been more sensitive towards the violations of the principles of the LOAC. Therefore, in circumstances of the violations of the law of weaponry, the belligerents are pressed and obliged to change their policy and conduct their military operations accordingly. Moreover, some weapons such as chemical and biological weapons are completely prohibited by almost all the countries in the world. In addition to chemical and biological weapons, certain conventional weapons are either prohibited or restricted to be used under some circumstances. This situation indicates the tendency of states to follow the law of weaponry.

The outline of my thesis is as follows. In the first chapter, the process of law of weaponry is discussed from the historical perspective. Throughout the history, it is estimated that over three hundred million people were killed in the wars through various types of weapons. From past to present, even in the ancient times, some brutal and cruel weapons had been prohibited in certain conflicts. For example, the ancient Hindu Code of Manu regulates the rules of conflicts including the protection of civilians, prisoners of war and the prohibition of the use of poisoned weapons in the conflicts. In addition to ancient rules, the religion sources of the Jewish, Christian and Islamic also emphasize the restriction and regulation of the conduct of conflict law. The first rules of modern law of armed conflicts were developed by Hugo Grotius in which he introduced the new definitions of the modern LOAC including 'just war' doctrine with 'jus ad bellum' and 'jus in bello' terms. The descriptions of these doctrines are clarified in three bases: military necessity, humanity, and chivalry.

The humanitarian values had been influential international politics. In the middle of the 19th century, Dr. Francis Lieber issued the document of Lieber Code. Although the Lieber Code was not an international instrument, the document served as a reference for the following international conventions. After that, St. Petersburg Declaration of 1868 is the first international agreement to prohibit a specific weapon in the conflict. With the emergence of the new weapon systems, the new rules and document was needed for the regulation of the law of weaponry. One of the basic principle of "unnecessary suffering" was mentioned in the document of the Hague Peace Conference of 1899 and in the Hague Peace Conference of 1907, for the first time, the use of air vehicle and the asphyxiating gas in the conflict was mentioned in the document of the law of war. The chemical weapons were used firstly in the First World War as means of weapons of mass destruction. The terrifying results of the chemical weapons resulted in the adoption of the Geneva Gas Protocol in 1925. Nevertheless, the protocol was not sufficient to prevent the use of chemical and biological weapons in the future conflicts.

Because of the destructive effects and common war crimes during the Second World War, The Geneva Convention of 1949 was convened to revise the protections for civilians and POW's rights, the review of previous conventions and to rewrite the law of conflict. After about two decades, the Biological Weapons Convention of 1972 was adopted that was the first to prohibit entirely the development, production and stockpiling of certain number of weapons. Notably, the use of herbicides for deforestation, and to manipulate the weather in Indo-China with muddying land routes by the USA during the Vietnam War led to adoption of the ENMOD Convention of 1976 which forbids the use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party. The Additional Protocol I of 1977 is crucial step as to the law of weaponry. The core principles of law weaponry including the unnecessary suffering and superfluous injury, the discrimination, the military necessary and proportionality are comprehensively defined in the Additional Protocol I.

In the first phase, the Conventional Weapons Convention of 1980 was insufficient. The first document consisted of three protocols; Protocol I restricts weapons with non-detectable fragments, Protocol II restricts land mines and booby traps, and Protocol III restricts incendiary weapons. However, the Protocol II could not prevent the death and injury of civilians because of the land mines. The Anti-Personnel Mine Ban Convention 1997 was prepared and adopted in Oslo in September 1997. Thus, Anti-Personnel Mine Ban is utterly conceded by almost all states. Fifteen years later, the Protocol IV, which restricted blinding laser weapons, was adopted in 1995. In 2003, the Protocol V brought arrangements and applications for the clearance of explosive remnants of war (ERW) as the last protocol of CCW.

After the end of the Cold War, the huge number of chemical weapons inventory had caused concerns by the states. The chemical weapons were the preferred weapons of mass destruction because of their cheapness and obtainability by the dictatorial regimes and terror organizations. Therefore, the Chemical Weapons Convention entered into force in 1997, the Convention prohibits the development, production, stockpiling, transferring, and the use of chemical weapons. The convention also gives responsibility to the Organization for the Prohibition of Chemical Weapons (OPCW) for the pursuance and verification of chemical weapons' destruction.

Similar to cluster munitions (bomblets or submunitions) have posed risks for civilians in the conflicts zones. Many civilians have lost their lives and wounded because of unexploded submunitions. NGO's and communities pointed out the hazards of cluster munitions to the United Nations (UN). The Cluster Munitions Convention was adopted by forty-six party states in which the use, production, transfer, and stockpiling of cluster munitions are prohibited. However, the level of participation on the Cluster Munitions Convention was not at desirable level at that time.

In the second chapter, initially, the distinction and definition between "the customary law" and "treaty law" are made. Then, the fundamental treaty or targeting law and customary principles of the law of weaponry are explained in details and illustrated by examples of the *Case* to be more comprehensive. After that with the development process of the modern armed conflict, the significance of humanitarian values has been also particularly crucial among modern states for decades. Notably, because of the long and bitter experiences during the Second World War, the principles of the law of weaponry began to be applied in the new protocols and conventions. The first fundamental principle is the distinction between combatants and civilians. The definition of civilian could not be made until the 1977 AP I. In relation to principle of discrimination, The International Criminal Tribunal for the former Yugoslavia (ICTY) sentenced Dusko Tadic in which one of the justifications of the verdict is the violation of discrimination principle. Accordingly, the planners and executors of air strike must distinguish between combatants and civilians in the conflict. They must take care of civilians and civilian targets during the military operations.

The second core principle of the law of weaponry is proportionality concerning the targeting law. When belligerents carry out the military attack on an enemy target, if the military strike causes the incidental loss of life and injury of the civilians, the situation is evaluated as an excessive or disproportionate military action. For instance, there is a single enemy sniper who kills friendly forces in the village. If the aggrieved party carries out the military strike on the village by means of carpet artillery or air bombings, the rural families would be destroyed because of the disproportionate use of force.

The indiscriminate attacks against civilians and civilian targets are absolutely prohibited. Indiscriminate attacks against military targets are also prohibited by the Additional Protocol I. If indiscriminate attacks cause collateral damage, the attacker becomes responsible for the action. If attacker state does not have the intention to harm civilians but attacker state causes civilian loss because of its reckless, emotionless aggression, this is an indiscriminate attack. Another case referred to in relation to the principle of the law of weaponry is the Case of the Santa Domingo Massacre v. Colombia. The court which the Inter-American Court of Human Rights (IACHAR) referred to the principles of proportionality and discrimination.

The customary and fundamental laws are supplementary rules of the law of weaponry. *Gary D. Solis* defines that "Customary law is the general practice of states which is accepted and observed as law from a sense of legal obligation. Customary law occurs when state practice is extensive and virtually uniform. In other words, practice begins and then spreads to other states. The widening practice eventually is accepted by states not as an option but as a requirement."[1]

The first fundamental principle which is the prohibition of superfluous injury and unnecessary suffering is one the fundamental principles of the Law of the Armed Conflict. The principle is relevant for military personnel rather than civilians. First of all, the concept of useless aggravates of suffering that result in an inevitable death was defined in the St. Petersburg Declaration. It is generally accepted that the definition of superfluous injury and unnecessary suffering includes the prohibition of weapons that cause suffering without really increasing the military advantage. According to the interpretation of the International Court of Justice (ICJ), the criterion is 'harm greater than that unavoidable to achieve legitimate military objectives'.

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[1] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, p. 10.

The second customary principle of the law of weaponry is the prohibition of indiscriminate weapons. The rule of discrimination of weapon is formulated in the AP I, according to which weapons must be capable of direction at specific military objectives, and their effects must be the limitation as required by law. For example, the famous V-1 and V-2 missile[2] system that hit London during the Second World War are indiscriminate weapons, because the missiles were unguided and had very high CEP (Circular Error Probable) ratio. Moreover, chemical, biological and nuclear weapons, Scud missiles, and Katyusha rockets are other examples of indiscriminate weapons. They have distinctive specifications; unguided, very high CEP ratio, and unforeseen consequences. Especially, the *Martic Case* of the ICTY is a good example in terms of understanding the seriousness of the use of the indiscriminate weapons.

The third and new customary principle of the law of weaponry is the protection of the environment. The environmental awareness takes an important place in the world communities. During the conflicts, when the belligerent intentionally strikes the enemy refineries, dams, nuclear power plants, the damage to these kinds of targets causes terrible and unforeseen environmental disasters. Moreover, the ENMOD Convention prohibits the use of environmental modification techniques that cause widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party.

In the third chapter in my study, the existing and prohibited weapon systems are reviewed according to the principles of law of weaponry. The first of all, the definition of conventional weapons is given as a weapon that causes damage due to their explosive or kinetic force such as bullets, bombs, mortars, or grenades. Concerning the conventional weapons, the St. Petersburg Declaration is the first international document that prohibits a specific type of bullet which is designed to penetrate hard surfaces. About a hundred years later, the Conventional Weapons Convention (CCW) becomes the second

[2] V-1 and V-2 missiles are surface to surface missile had been developed and launch by Nazi German Army during the Second World War.

important document to prohibit and restrict certain conventional weapons such as mines, booby traps, and incendiaries.

The use of incendiary weapons is restricted by CCW. However, the use of incendiaries is still discussed by INGO's. The supporters of banning of incendiary weapons put forward the argument that incendiary weapons cause superfluous injury and unnecessary suffering on the military or civilian targets. The incendiary weapons produce high heat and intense fire through a chemical reaction of inflammables.

The blinding laser systems were prohibited before the deployment in any conflicts by the CCW Protocol IV. Perhaps, this application will be a reference for the future possible situations. However, the military laser applications like range finding, target designation, jamming, dazzling, communications, and weapons guidance do not breach the LOAC, even if they cause serious eye injury or permanent blindness accidently.

The Weapons of Mass Destruction are classified into chemical, biological and nuclear weapons. Chemical weapons are the deathliest of all. From the first use during the First World War to present, chemical weapons have been used many times and caused the death and injury of hundreds of thousands of combatants and civilians in the conflicts. The specifications of chemical weapons are explained and the instances of the use of chemical weapons in the conflicts are given in history. After the end of the Cold War, the issue of chemical weapons was brought to the agenda of the United Nations. Chemical Weapons Convention (CWC) of 1993 prohibited not only the use of chemical weapons but also to develop, produce and acquire the stockpile of them.

Indeed, biological weapons were the first strictly prohibited weapon of mass destruction in the law of weaponry. The reason is that particularly, the United States and former USSR had carried out the secret research biological programs during the Cold War. They noticed the horrific consequences of possible biological warfare. A potential biological warfare may have caused uncontrolled epidemic, food shortages and economic loss, environmental catastrophes, and widespread illness. As a result, the Biological Weapon Convention entered into force on 26 March 1975.

Although nuclear weapons are the most catastrophic weapon systems in the world, there is no obligatory document and provision to prohibit their use. However, the World Health Organization (WHO) and the United Nations General Assembly adopted resolutions in the International Court of Justice (ICJ) to give an advisory opinion about legality of the threat or use of nuclear weapons according to the international law. The ICJ adjudicated that the threat and the use of nuclear weapons would be a breach of international customary law. Yet, in case of a self-defense of a state for survival, the court could not adjudicate a definite judgment.

In the third chapter, in addition to certain prohibited of restricted weapon systems, the other weapon systems are examined on the basis of the law of weaponry. Bombs, missiles, rockets, blast weapons and flechettes are evaluated on the basis of two fundamental customary principles of the law of weaponry; discrimination and superfluous injury or unnecessary suffering. However, the situations of white phosphorous and depleted uranium are distinctive and separated from other conventional weapons. White phosphorus (WP) has been used as igniter, incendiary, smoke, tracer or for illumination. The main concern as to WP is the effect of the Phosphorus in which WP causes deep burns and damages muscles and deep tissues via unextinguished WP. Inhibition of the oxygen transfer is required. The use of WP as incendiary weapon is thought to be a breach of the superfluous injury and unnecessary suffering principle. The circumstances of the WP are evaluated via the cases of the Iraq, Afghanistan and Gaza conflicts.

In the third chapter, the debate of the use of depleted uranium (DU) is analyzed according to both sides of the debate. The depleted uranium is produced from the used nuclear fuel rods thereby radioactivity reduction. Because of the distinctive specification of the DU, it is used as penetrator ammunition and armor plate in the tanks. However, DU creates health and environment problems after the impact. Some health organizations have alleged that the use of DU causes heavy metal poisoning in human body, and environmental pollution.

Besides the weapons, the explosive remnants of war (ERW) and unexploded ordnance (UXO) are crucial issues for humanity. ERW and UXO cause the deaths and injury of thousands of people in the world. International Committee of the Red Cross (ICRC) and a British NGO, Landmine Action made a proposal for ERW, UXO, and abandoned landmines in 2000. One year later, a group of governmental experts began to examine the issue of explosive remnants of war and hold a meeting under the title of the Review Conference in December 2001. After two years of debate, the Protocol V to the 1980 CCW on Explosive Remnants of War was adopted on 28 November 2003.

In the last and fourth chapter of my thesis, the future of weapons in the law of the air force is reviewed according to the law of weaponry. Firstly, the Unmanned Aerial & Combat Vehicles (UAV & UCAV) is reviewed according the law of conflict. UAV & UCAV technology has been actively used in the conflicts for two decades. Especially, UCAV has been actively used to carry out military strikes against militants in the global war on terror for about two decades. However, the use of UCAV has created concerns about the issue of the controller and crews of UAVs under the Law of Armed Conflict (LOAC). One of the most important concerns is that the controller and crews of UAVs in non-international armed conflicts are civilians. Because of UCAV strikes, many civilians lost their life and got wounded. With regard to the responsibility of the indiscriminate attacks, this circumstance raises the issue of the crews or controllers of UAV under the law of the armed conflict.

The use of autonomous weapon technology in the military field has increased in the last decade. Autonomous weapon system (AWS) is a machine that entirely or partially self-controlled, have the ability to make decisions independently to detect, identify and engage targets beyond human control. Especially, AWS’s have been deployed in ballistic or missile defense, surveillance and reconnaissance systems. Nevertheless, these systems are passive defense systems and have no capability of directly killing human targets. The core debate is the use of AWS systems to engage and destroy human targets. Therefore, the autonomous weapons systems have raised significant ethical and legal concerns for future deployment in the conflicts.

Nanotechnology is another promising technology in numerous fields. Moreover, nanotechnology has many areas of military applications. Thomas Faunce and Hitoshi Nasu gave examples of future military applications such as miniaturization of communication devices, more precisely biological-chemical sensors, lighter and more durable vehicles, conventional missiles with reduced mass and enhanced speed.[3] However, the military applications of nanotechnology have the potential to cause unforeseen devastating consequences on the human body and environment. Nanorobots may duplicate uncontrollably and consistently themselves. Nanotechnology may also be deployed as a biological agent in conflicts. Furthermore, nanotechnology may disable the human immune system by disabling the effectiveness of vaccination against diseases.

The last concern is the cyber warfare. In the last decade, many cyber-attacks were carried out by unidentified fellows or agencies. Undoubtedly, the cyber warfare is reviewed according to the customary principles of the law of conflict in the fourth chapter. For example, the principles are binding for the states that they are banned to choose unlimited methods or means of cyber war and to cause superfluous injury or unnecessary suffering. The given historical example of cyber-attacks, the issue of the cyber warfare is evaluated based on the principles of the LOAC.

In the last part of my thesis, the relation between the law of weaponry and the applications of the air force is evaluated in terms of the Humanitarian Law, on International Politics, and with regard to Humanitarian Impacts of Air Force Operations.

[3] Thomas Faunce and Hitoshi Nasu, "Nanotechnology and the International Law of Weaponry: Towards International Regulation of Nano-Weapons", **Journal of Law, Information and Science**, Vol. 20, no. 2009/2010, (2009-2010), pp. 21-54.

CHAPTER ONE

HISTORY OF THE LAW OF WEAPONRY

The concept of law is a body of rules, that must be obeyed, and subject to sanctions or legal consequences. While there have been rules for the conflict for thousands of years, the law of armed conflict for the battlefield is only about hundred years old.[4] In the course of human history, philosophers, statesmen, and soldiers have made efforts for restrictions and prohibitions on the use of armed forces.[5] The historical instances show that leaders and statesmen in Ancient China and early Islam approved normative principles for protecting civilians in war. So, the evolution of norms for armed conflict is originated neither in modern law nor in Western culture.[6] However, the modern law of armed conflict has emerged in Western thought with the development of just war theory.

Since the 15th century, many thinkers have made contributions to the development of the modern law of armed conflict. For instances, one of the most famous was a Dutch jurist and scholar, *Hugo Grotius* (1585–1645), who is called as the father of international law. *Hugo Grotius* published three-volume book *"On the Law of War and Peace"* that is the first definitive international law text. He defined the limits of war based on his "just war" doctrine, with *jus ad bellum* and *jus in Bello.*[7]

The concept of just war theory is divided into two parts in mainstream Western thought. The first *jus ad bellum* concerns the law as to conflict management, and how States initiate armed conflict (i.e. under what circumstances the use of military power is legally and morally legitimate). The

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[4] Gary D. Solis, "**The Law of Armed Conflict: International Humanitarian Law in War**", Cambridge University Press, Cambridge, 2010, pp. 578-579.

[5] Howard M. Hensel, "**The Legitimate Use of Military Force: The Just War Tradition and the Customary Law of Armed Conflict**", Ashgate Publishing Limited, Surrey, England, 2008, p. 309.

[6] David Traven, "Moral Cognition and the Law and Ethics of Armed Conflict", **International Studies Review,** Vol. 17, no. 4, 2015, pp. 556–587.

[7] Gary D. Solis, pp. 17-18.

second *jus in Bello* focuses on the law governing the actions of States when the conflict has occurred (i.e., what legal and moral restraints apply to the conduct of waging war).[8] In the course of events, just war doctrine gradually has been developed into a framework for next progression of the law of armed conflict by proponents.[9]

Three primary concepts including military necessity, humanity and chivalry underlie the law of armed conflict.[10] The principle of military necessity legitimizes the use of all measures needed to defeat the enemy as quickly and efficiently as possible that is not prohibited by the law of war.[11] Chivalry meant the duty to act honorably including justice and loyalty, courage, honor and mercy, obligations to not to kill the vanquished enemy, and to keep one's word.[12] Chivalry is also called *honor*. Chivalry has been important to the development of the law of war.[13] Especially, the contemporary concept of humanity in international law of armed conflict has emerged and been emphasized frequently in the documents of conventions and protocols ever since the eighteenth century.

The principal of the law of weaponry is based on these mentioned concepts. Thus, the prohibition of indiscriminate weapons and methodology of warfare is designed to distinguish between civilians and combatants or civilian objects and military objectives. Likewise, the principle of unnecessary suffering prohibits weapons that cause suffering and death which are not necessary for the achievement of legitimate military goals. Further, the contemporary law of weaponry restricts the use of weapons and methods of

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[8] The Judge Advocate General's Legal Center and School, William J. Johnson, Anew D. Gillman, **Law of Armed Conflict Deskbook: 2012**, Createspace Independent Pub, Virginia, 2014, p. 10.
[9] Howard M. Hensel, p. 310.
[10] W.J. Fenrick, "New developments in the law concerning use of conventional weapons in armed conflict", **Canadian Yearbook of International Law**, Vol. 19, 1981, p. 230.
[11] Department of Defense, "**Law of War Manual**", General Counsel of the Department of Defense, Washington DC, 2015, p. 52.
[12] Gary D. Solis, "**The Law of Armed Conflict: International Humanitarian Law in War**", Cambridge University Press, Cambridge, 2010, p. 5.
[13] Department of Defense, "**Law of War Manual**", General Counsel of the Department of Defense, Washington DC, 2015, p. 66.

warfare which have a substantial adverse effect on the natural environment.[14] With the historical process of the law of armed conflict, correspondingly, the law of weaponry has also been progressed with the development of weapons and means of warfare.

In the ancient times, belligerents were not under responsibility of observance of the restraint of law. Both sides had used rocks, swords, and arrows, spears to kill or injure enemies. With the development of respective technologies, belligerents had begun to use more damaging means such as poisons, catapults, crossbows and boiling oils. However, the law of weaponry in the meaning of international law began to emerge in the 18th century. First known law for restricted use of weapons emerged in Hindu Code of Manu issued about 200 AD. It prohibited the use of poised arrows.[15] The another historical agreement is that article 57 of the Strasbourg Agreement in which prohibited usage of poison weapons signed between French and German Forces in 1675. The agreement included the prohibition of the use of poisoned bullets and it was valid only for the duration of the war.[16] It is explicit that prohibited weapons treaties were brought into force among the nations. Nevertheless, these treaties were not approved as having a universal meaning up until the 19th century.

1.1 THE EMERGENCE OF THE MODERN LAW OF WEAPONRY BEFORE THE SECOND WORLD WAR

1.1.1. Lieber Code

The appearance of the modern law of war emerged in the 1860s. The first document was Lieber code. Dr. Francis Lieber was enlisted in the Prussian Army. He fought against Napoleon French Army, and he was wounded

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[14] Christopher Greenwood, "Law of Weaponry at the Start of the New Millennium", **International Law Studies Series**, US Naval War College, Vol. 71, 1998. pp. 185-232.
[15] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 8.
[16] Catherine Jefferson, "Origins of the norm against chemical weapons", **International Affairs**, Vol. 90, no. 3, 2014, p. 648.

seriously at Namur. Lieber also joined to the Greek Independence War to fight against the Ottomans. During the American Civil War, Dr. Francis Lieber lectured at Columbia University on the customs and use of war and other issues. He was assigned to codify a compilation of the customary rules of warfare by General Henry W. Halleck. With the help of his military experience, he codified Lieber Code for Union Forces.[17] He analyzed to what limits the military necessity should allow. He did not approve brutality, and he referred to the example of cruelty for revenge and use of poison.[18] Consequently, Lieber Code provided the significant contribution to the development of the law of weaponry.[19]

1.1.2. St. Petersburg Declaration

In the modern law of weaponry, St. Petersburg Declaration is the first multilateral agreement to prohibit a particular weapon in the battlefield. The fundamental reason of the St. Petersburg Declaration was to prohibit the specific type of a bullet which was used on the battlefield. This bullet was designed to penetrate hard surfaces. This bullet had been designed for the Russian Imperial Army to detonate enemy ammunition wagons. However, in time, the bullet modified for used against soft surfaces. When the bullet hit a smooth surface, especially human flesh, it exploded and damaged its target more than regular bullets. This event had created superfluous injury and unnecessary suffering on the human target.[20] Because of humane concerns, Tsar Alexander II invited states to meet up at an International Military Commission in St. Petersburg to review whether to forbid the use of certain projectiles against soldiers.[21]

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[17] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, pp. 39-40.
[18] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 9.
[19] Catherine Jefferson, "Origins of the norm against chemical weapons", **International Affairs**, Vol. 90, no. 3, 2014, p. 648.
[20] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, p. 49.
[21] Boothby, p. 10.

The Contracting Parties engage mutually to renounce, in case of war among themselves, the employment by their military or naval troops of any projectile of a weight below 400 grammes, which is either explosive or charged with fulminating or inflammable substances.[22]

According to the article, Party States agreed to not use bullets which includes explosive weighing less than 400 grammes. However, explosive bullets should not be confused with tracer or dum dum bullets.[23]

Another important point is that it was the first time a declaration mentioned an initial framework article of military necessity.[24] The declaration stated the following:

That the progress of civilization should have the effect of alleviating as much as possible the calamities of war;
That the only legitimate object which States should endeavor to accomplish during war is to weaken the military forces of the enemy;
That for this purpose it is sufficient to disable the greatest possible number of men; That this object would be exceeded by the employment of arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable;
That the employment of such arms would, therefore, be contrary to the laws of humanity…[25]

1.1.3. The Hague Peace Conference of 1899

For the first time, the fundamental notion of unnecessary suffering mentioned in the article as "the employment of arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable [is] contrary to the laws of humanity"[26] and became the core premise of the future international agreement. Certainly, the purpose of the armed conflict is disabling enemy forces; it does not mean that all should be destroyed, killed or cause reasonless

[22] ICRC, Declaration Renouncing the Use, in Time of War, of certain Explosive Projectiles, The **1868 St. Petersburg Declaration,** https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=568842C2B90F4A29C12563CD0051547C, (30.01.2016).
[23] Gary Solis, pp. 49-50.
[24] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 10.
[25] ICRC, Declaration Renouncing the Use, in Time of War, of certain Explosive Projectiles, **The 1868 St. Petersburg Declaration,** https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=568842C2B90F4A29C12563CD0051547C, (30.01.2016).
[26] **The 1868 St. Petersburg Declaration.**

injury to enemy forces. The article “That the only legitimate object which States should endeavor to accomplish during war is to weaken the military forces of the enemy” refers to the object of armed conflict.[27] The St. Petersburg Declaration, which is the first multilateral document to ban a particular type of weapon, was settled over by seventeen countries with the reference to following declarations of Hague Conferences of 1899 and 1907.

By the way, other crucial steps between St. Petersburg Declaration and Hague Conferences were Brussels Declaration and Oxford Manual. On the initiative of Tsar Alexander, fifteen European Countries met in the Brussels to review the draft of international agreement of the laws of war. Still, delegations were unable to build consensus on any binding convention. In addition to this, the countries agreed to initiate the Institute of International Law to have responsibility for the codification of the laws of war.[28] The Institute of International Law assigned a committee to examine the Brussels Declaration and advice for pro and congruent of the law of armed conflict. The Committee of Institute of International Law has prepared Oxford Manual.[29] Brussels Declaration and Oxford Manuals of 1880 would be the basis of Hague Conferences on land warfare.

The main reason for the Hague Conference of 1899 was the concern of excessive military expenditures between rival hegemonic powers of England, Germany, and Russia. Russia had not reached the level of military expenditure of its rival emperors because of its economic recession. The proposal of disarmament would help to stabilize Russia’s inertial development and support to carry out its penetrations and expansionist policy to Far East Asia. Despite political concerns, apparently the conference convened with humanitarian motives.[30] The first Hague Conference joined twenty-six countries convened

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[27] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, p. 50.
[28] ICRC, Project of international Declaration Concerning the Laws and Customs of War, **Brussels Declaration 1874**,
https://www.icrc.org/ihl/INTRO/135, (01.02.2016).
[29] US Committee of the Blue Shield, The Laws of War on Land, **Oxford Manual 1880**, http://uscbs.org/1880-oxford-manual.html, (01.02.2016).
[30] Thomas K. Ford, “The Genesis of the First Hague Peace Conference”, **Political Science Quarterly**, Vol.51, no.3, 1936, pp. 354–382. http://doi.org/10.2307/2144022

for two months from 18 May 1899 to 29 July 1899 that signed the declaration.[31] By the time of the Hague Conferences of 1899 and 1907, prohibition of specific weapons were limited to poisonous weapons and explosive bullets under 400 gram. Besides the disarmament concerns, new military technological developments created concern because of asphyxiating gases, balloons, and naval mines.[32] Nevertheless, the declaration of the prohibition of the use of asphyxiating gases would not be satisfactory. During the Great War, asphyxiating gases and vesicant agents resulted in the deaths and injuries to over a hundred thousands of people.

The document of the Hague Conference consisted of four main sections and three additional declarations. The first three sections are about Pacific Settlement of International Disputes, Laws and Customs of War on Land and Adaptation to Maritime Warfare of Principles of Geneva Convention of 1864 and the fourth section is about Prohibiting Launching of Projectiles and Explosive from Balloon. Declarations I is On the Launching of Projectiles and Explosive from Balloon. Declaration II is on the use of Projectiles the Objects of Which is the Diffusion of Asphyxiating or Deleterious Gases. Declaration III is on the Use of Bullets Which Expand or Flatten Easily in the Human Body.[33]

Especially, Declaration I is very crucial step in the development of law of weaponry. It was the first time an air vehicle was mentioned in a legal document of war and limited its use for military purposes in the area of conflict. Similar to the potential use of asphyxiating gas in the conflict zone, possible use of launch of projectiles and explosive from balloon created concern over the countries. However, there is the important point that "The Contracting Parties agree to prohibit, for a term of five years, the launching of projectiles and explosive from balloons or by other new methods of a similar

[31] Catherine Jefferson, "Origins of the norm against chemical weapons", **International Affairs**, Vol. 90, no. 3, 2014, p. 649.
[32] William H. Boothby, 2009, p. 12.
[33] Catherine Jefferson, 2014, p. 652.

nature."[34] Nevertheless, the prohibition would be limited during just five years after the ratification by party states.

The other concerning issue of new military development was the potential use of asphyxiating gas. The contracting parties settled over the prohibition of the use of projectiles, the sole object of which is the diffusion of asphyxiating or deleterious gases. Nevertheless, the belligerents could use projectiles that have the capability of fragmentation, blast, and asphyxiating gas. The term of "sole object" had limited the meaning of prohibition of asphyxiating gas.[35]

The case of expanding bullets is another important step to prohibit using a particular weapon system in the conflict zone. Hague Conference 1899 Declaration 3 described the Use of Bullets Which Expand or Flatten Easily in the Human Body according to unnecessary suffering and superfluous injury principle of customary law. On impact, expanding bullet (dum-dum bullets) causes mushrooming of the bullet because of hard jacket uncovers their whole core. The impact of the bullet creates wounds of much greater severity than similar wounds involving fully jacketed round. The Contracting Parties agree to avoid the use of bullets, which expand or flatten easily in the human body based on the customary principle of military necessity and superfluous injury.[36]

1.1.4. Hague Peace Conference of 1907

Then US President Teddy Roosevelt called for a second conference to be convened in Hague from June to mid-October 1907. The main issue of concern was the establishment of a permanent international court of arbitration to settle dissent between states that might have a conflict between them. However, negotiations failed because of lack of confidence. With the

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[34] ICRC, Declaration (IV,1) to Prohibit, for a Term of Five Years, the Launching of Projectiles and Explosive from Balloons or by Other New Methods of a Similar Nature, **The Hague Conference 1899**. https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=C372920FFD61039AC12563CD00516126, (01.02.2016).
[35] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 13.
[36] William H. Boothby, 2009, p. 14.

difference of Hague Conference 1899, three conventions of Hague in 1899 were revised, and ten new conventions and a declaration were adopted.[37] Particularly the field of law of the naval warfare was elaborated and is up to date. The Hague Conference Declaration I about the "prohibit[ion], for a term of five years, the launching of projectiles and explosive from balloons or by other new methods of a similar nature" was revised to Declaration XIV – "Prohibiting the Discharge of Projectiles and Explosive from Balloons". The principle of "for a term of five years" was repealed from Declaration I. Declaration XIV was adopted as "The Contracting Powers agree to prohibit for a period extending to the close of the Third Peace Conference, the discharge of projectiles and explosives from balloons or by other new methods of a similar nature."[38] As a result, the Hague Conference of 1907 did not make any progress on the law of weaponry.

In 1914, the Great War, which was known as the end of all began between the Axis and Allied Powers. All belligerents mobilized about 65 million soldiers during the War. The unprecedented scale of industrial mobilization, new military vehicles, and military tactics played important roles in changing the course of events at the end of the War. In the end, warring factions lost approximately ten million people and over fifteen million people were injured during the four years. At the same time, new advanced military technologies emerged and used very often in the war zone; among these systems were machine guns, tanks, aircrafts, submarines and poisonous gas.[39] Although the Hague Conferences prohibited the use of the use of projectiles, the sole object of which is the diffusion of asphyxiating or deleterious gases, poisonous gases have been used on large scale in the course of the War.[40] The German army infringed the prohibition of the use of asphyxiating or

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[37] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, pp. 54-55.

[38] ICRC, Declaration - XIV, Prohibiting the Discharge of Projectiles and Explosive from Balloons, **The Hague Conference 1907**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=79A3374B81C3D30EC12563CD00517745, (02.02.2016).

[39] Gary. D. Solis, 2010, p. 74.

[40] Yoram Dinstein, **The Conduct of Hostilities under the Law of International Armed Conflict,** 2nd Edition, Cambridge University Press, Cambridge, 2010, p. 73.

deleterious gases, poisonous gases by releasing the toxic chlorine cloud from cylinders dug into the trenches on 22 April 1915. After this infringement, all belligerents adopted routinely warfare agents by all feasible means.[41] By 1918, the hostile powers of the war produced more than 125,000 tons of Chemical War Agent. Chemical weapons produced by belligerents caused over one million casualties and 90,000 deaths. Additions to the asphyxiating or deleterious gases, many different chemicals were developed such as the lung toxicants, chlorine, phosgene and the vesicant and blistering agents.[42]

1.1.5. The Geneva Gas Protocol of 1925

After the First World War, German chemical industrial capability was a big concern for conquering states because of bitter experiences of the chemical warfare. The first issue during the Paris Peace Conference was to take control of German chemical warfare capabilities in which Germany should be forbidden to produce chemical war agents. The British representative gave the proposal to inform details of the German's production process of war materials. Nevertheless, the US President Woodrow Wilson rejected the proposal because of the possible loss of commercial secrecy of Germany.[43] The League of Nations convened an International Conference on the Control of the International Trade in Arms, Munitions, and Implements of War in 1925. The Geneva Gas Protocol was adopted by the Contracting Parties. The Geneva Gas Protocol was more comprehensive arrangement than previous conventions as to gas protocol. This treaty includes wide scale prohibition of weapons of asphyxiating, poisonous or other gases and their launch systems. In addition to the gas protocol, for the first time, biological warfare materials and bacteriological methods of warfare were been banned by the Geneva treaty

[41] Jean Pascal Zanders, "International Norms against Chemical and Biological Warfare: An Ambiguous Legacy", **Journal of Conflict and Security Law**, Vol. 8, no. 2, 2003, p. 395.
[42] Aswin Mangerich and Charlotte Esser, "Chemical warfare in the First World War: reflections 100 years later", **Archives of Toxicology**, Vol. 88, no. 11, 2014, p. 1909.
[43] Catherine Jefferson, "Origins of the norm against chemical weapons", **International Affairs**, Vol. 90, no. 3, 2014, p. 657.

documents.[44] With the Geneva Protocol of 1925, prohibition of the use of chemical and bacteriological warfare material and means of delivery was universally accepted in International Law.

1.2 THE PROGRESSION OF THE MODERN LAW WEAPONRY AFTER THE SECOND WORLD WAR

The Second World War was the most destructive war in which almost all countries of the world were involved in the widest geography of all time and caused the deaths of over fifty millions of people during the six years notwithstanding all modern law of war and conventions. The violations of the law of war were widespread by each belligerent against both civilian and prisoners of war (POW). Most of them were killed by malnourishment, starvation, discrimination, deportation, genocide and hundreds of thousands of civilians were exhausted in the US fire-bombing of Japan and the area bombing of Germany by the British Air Forces. Under these circumstances, new human rights movements commenced after the Second World War. The Geneva Convention of 1949 was convened to revise protections for civilians and protection of POWs' rights. The war crimes during the Second World War forced the parties to consolidate the law of conflict. This was an opportunity to review not only previous conventions but also rewrite the law of conflict.[45]

1.2.1 The Biological Weapons Convention

The Gas Protocol of 1925 only prohibited the use of chemical and biological weapons and means of delivery. The painful experiences during the Second World War showed that the Geneva Convention of 1925 could not succeed to prevent the use, production, development, transfer, stockpiling and acquisition of such munitions. The implicit threat remained within the postwar

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[44] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 17.
[45] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, pp. 80-81.

period, and the prohibition would only apply between contracting parties. Thus, starting in 1968, because of discussions and meetings in the United Nations and with the US proposal, prohibition of biological weapons became an important topic of international arena. The Conference of the Committee on Disarmament prepared the text of the Convention and submitted it to the U.N. General Assembly in 1971. The Convention began to be signed on 10 April 1972 and entered into force on 26 March 1975. The Biological Weapons Convention of 1972 is the first treaty which prohibits the development, production and stockpiling of entirely a single type of weapons.[46] In brief, under Article I of the Biological Weapons Convention of 1972, States Parties entered into the obligation to never develop, produce, stockpile, and acquire microbial, other biological agents and their toxins for peaceful purposes or hostile purposes or in armed conflict.[47]

1.2.2 Environmental Modification Convention

The USA's widespread use of herbicides for deforestation, crop destruction and manipulation of weather in Indo-China, together with the muddying of land routes in North Vietnam revealed the need for regulations to the prohibition of the use of the environment as a tool to gain advantages in battlefields.[48] Concerning the issue, the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques was adopted by the UN General Assembly in 1976. The ENMOD Convention defines to responsibilities of party states as "undertakes not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to

[46] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 126.
[47] William H. Boothby, **Conflict Law: The Influence of New Weapons Technology, Human Rights and Emerging Actors**, TMC Asser Press, The Hague, 2014, p. 166.
[48] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 92.

any other State Party".[49] Especially, the ENMOD Convention-Article II explains the use of hostile environmental modification techniques, which are described as 'any technique for changing—through then deliberate manipulation of natural processes—the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere, and atmosphere, or of outer space.'[50]

1.2.3 Additional Protocol I

One of the crucial steps of the development of law of weaponry was the Additional Protocol I. The Switzerland convened a diplomatic conference in 1974. The purpose of the conference was the reassessment and development of the Geneva Conventions to codify principles of the modern law of armed conflict. Particularly, the Article 35 remarks that the choice of methods or means of warfare by the Party States is not unlimited. It prohibits employing weapons, projectiles, material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering, and prohibition to employ methods or means of warfare, which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.[51] Despite some significant improvements, the Additional Protocol I also lacked any restrictions on conventional and the nuclear weapons. Even so, Sweden attempted to add a clause in the conventional weapon restrictions. The United States did not support Sweden's initiative because of unwilling to any

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[49] ICRC, Convention on the Prohibition of Military or Any Hostile Use of Environmental Modification Techniques, **ENMOD Convention**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=2771DB89FF11D8B4C12563CD0051FB44, (06.02.2016).
[50] Thomas Faunce, "Nanotechnology and Military Attacks on Photosynthesis", **The New Technologies and The Law of Armed Conflict**, Ed. Nitoshi Natu and Robert McLaughhlin, Asser Press, The Hague, 2014, p. 186.
[51] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 18.

restrictions on nuclear weapons. Moreover, the USSR and its allies also objected to Sweden's initiative.[52]

1.2.4 The Conventional Weapons Convention

By the 1980s, conventions of the law of weaponry had abstract, intangible, superficial, limited extend and quite general sense. In the meantime, the previous Conventions were not satisfactory in restricting particular conventional weapon systems, as in the case of the Conventional Weapons Convention of 1980 (CCW). CCW was not sufficient for the demands of negotiators; nonetheless, CCW broke down the prejudices and became an important step in the negotiations to ban specific conventional weapons. CCW was to be a basis for the following Conventions of Ottawa and Convention on Cluster Munitions.[53] The Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons had three fundamental protocols. The Protocol I prohibited the use of weapons that injure with fragments that cannot be detected by x-rays. The Protocol II imposes certain restrictions on the use of mines and booby traps.[54] Protocol III restricts the use of air-delivered incendiary weapons on densely populated civilian objects. At the First Review Conference of the CCW, the Protocol on Blinding Laser Weapons Protocol IV was adopted on 13 October 1995. As per the Protocol IV, laser weapons designed to cause permanent blindness to unenhanced vision are prohibited.[55] After the painful experiences of the Kosovo, Afghanistan and Iraq Operations due to unexploded ordnance, the States and Non-Governmental Organizations (NGO) began to act sensitively and launched an initiative for the restriction of Cluster Munitions under the Conventional Weapons Convention of 1980.

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[52] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, p. 122.
[53] William H. Boothby, 2009, pp. 18-19.
[54] Christopher Greenwood, Current Issues in the Law of Armed Conflict: Weapons, Targets and International Criminal Liability, **Singapore Journal of International & Comparative Law**, No. 1, 1997, pp. 441-467.
[55] William H. Boothby, **Conflict Law: The Influence of New Weapons Technology, Human Rights and Emerging Actors**, TMC Asser Press, The Hague, 2014, pp. 164-165.

However, their attempts have failed. Nevertheless, the CCW states adopted the Protocol V on Explosive Remnants of War (ERW). The Protocol V became an important step in achieving the objective of Cluster Munitions Convention of 2008.[56]

1.2.5 Chemical Weapons Convention

As mentioned above, the Geneva Convention of 1925 could not prevent the use of chemical weapons in conflicts because of a lack of common understanding. The Gas Protocol of 1925 prohibited only the use of chemical weapons among the belligerent party states. The Halabja Massacre of 1988 in the Iran–Iraq War caused the revision of the Geneva Convention of 1925. The Chemical Weapons Convention (CWC) of 1993 prohibited not only the use of chemical weapons but also to develop, produce, acquire and stockpile them. In sum, CWC was more comprehensive than the Geneva Protocol of 1925.[57]

1.2.6 Anti-Personnel Mine Ban Convention

During the 1980s, the anti-personnel landmine was not a primary issue; the fundamental issue was the antinuclear peace talks between the superpowers. After the demise of the Soviet Union, anti-personnel landmines became dangerous than ever before due to emerging civil wars. Anti-personnel landmines caused more civilian casualties than soldiers in the past. This circumstance created a stance against anti-Personnel landmines on the world public opinion. Notably, because of the efforts made by NGOS such as the ICRC and Mines Advisory Groups, the UN secretary-general decided to convene a conference to review the Protocol II of the CCW in Geneva in

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[56] Bonnie Docherty, "Breaking New Ground: The Convention on Cluster Munitions and the Evolution of International Humanitarian Law", **Human Rights Quarterly**, Vol. 31, no. 4, 2009, pp. 938-939.

[57] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, pp. 129-130.

1996.[58] As a result, the Anti-Personnel Mine Ban Convention of 1997 was adopted in Oslo in September of 1997. The Anti-Personnel Mine Ban Convention prohibits the use, development, production, stockpiling, and transfer of anti-personnel landmines.[59]

1.2.7 Cluster Munitions Convention

The last restricted certain weapons systems were cluster munitions. Cluster Munitions have been used in many international conflicts such as the Gulf Wars, the Kosovo War, and the Invasion of Afghanistan. Indeed, cluster munitions had been a worrying issue and needed to be discussed in a convention. However, it would not be achieved until the Cluster Munitions Convention. The turning point was when Israel carried out a military operation in the South of Lebanon in 2006. The Israel Defense Forces extensively used cluster munitions by means of air and artillery delivery systems. These cluster munitions dropped about four million submunitions according to the UN sources. Unexploded ordnance caused the death of over 150 people in the first six months after the strike. The state parties noticed the deficiency of the CCW Convention in such cases. With the participation of nearly 300 NGOs and 30 party states, the United Nations convened a meeting to negotiate a convention on cluster munitions. After fifteen months, the Cluster Munitions Convention, known as the Oslo Declaration, was adopted by forty-six party states to prohibit “the use, production, transfer, and stockpiling of cluster munitions that cause unacceptable harm to civilians” as well as measures on stockpile destruction, clearance, victim assistance, and risk education.[60]

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[58] Ramesh Thakur and William Maley, “The Ottawa Convention on Landmines: A Landmark Humanitarian Treaty in Arms Control?”, **Global Governance**, Vol. 5, no. 3, 1999, pp. 273-302.

[59] Geneva Academy of International Humanitarian Law and Human Rights, The Anti-Personnel Mine Ban Convention, **Ottawa Convention**, http://www.weaponslaw.org/instruments/1997-anti-personnel-mine-ban-convention, (07.02.2016).

[60] Bonnie Docherty, "Breaking New Ground: The Convention on Cluster Munitions and the Evolution of International Humanitarian Law", **Human Rights Quarterly**, Vol. 31, no. 4, 2009, p. 940.

CHAPTER TWO

THE BASIS OF THE LAW OF WEAPONRY

2.1 CUSTOMARY PRINCIPLES OF THE LAW OF WEAPONRY

Before the entering into the details of the principles of the Law of Weaponry, the distinction and definition between "the customary law" and "treaty law" must be made. The principles of the law of weaponry are based on the basis of the customary and treaty law.

2.1.1. Customary Law

Initially, the definition of "customary law" should be clear. *Gary D. Solis* defines that "Customary law is the general practice of states which is accepted and observed as law from a sense of legal obligation. Customary law occurs when state practice is extensive and virtually uniform. In other words, practice begins and then spreads to other states. The widening practice eventually is accepted by states not as an option but as a requirement, finally maturing into customary law."[61]

Moreover, *Yoram Dinstein* emphasizes that "Customary international law crystallizes when there is 'evidence of a general practice accepted as law'", nonetheless he states that there are two components which objective and subjective. The objective component is the practice of states. The subjective is 'accepted laws'. The two components must be complementary in order to be accepted as a customary law. However, even the some states have not accepted as a customary law, because of the majority states accepts as customary rule it is binding on all states.[62]

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[61] Gary. D. Solis, 2010, p. 10.
[62] Yoram Dinstein, **The Conduct of Hostilities under the Law of International Armed Conflict,** 2nd Edition, Cambridge University Press, Cambridge, 2010, pp. 5-6.

In addition, *David Jensen and Silja Halle* define the customary law as "Shared international rules established through widespread and uniform State practice, under the general belief that particular obligations bind all States, in contrast with treaty law, which applies only to those States that expressly consent to the respective treaties."[63]

On the other hand, *William H. Boothby* states, "If all states must not behave in a completely uniform way for a customary rule to develop, it is nevertheless clear that if there is significantly differing conduct on the matter among the states, this will prevent the emergence of such a rule". Moreover, the customary rule is required to be consistent practice. He also emphasizes that "while no state has the right to decline to comply with a customary rule, states may decline to follow rules that are forming as customary rules but have not yet achieved that status. It is, therefore, vital to distinguish between rules that have already achieved customary status and rules that have yet to become customary."[64] In brief, the customary law is extensive, consistently and accepted universal laws which obligations bind all States.

2.1.2. Treaty Law

According to the definition of the *William Boothby*, the term of 'treaty' means, "an international agreement concluded between States in written form and governed by international law." The two elements are important for validation of the treaty; the first is the presence of the participating states and second is the treaty binds only participatory states. The term of 'treaty' may be broad meaning, and the treaty includes such as international agreements, treaties, conventions, protocols and similar instruments. However, firstly, the treaty is negotiated, then signed, and finally ratified by participating states.[65] The Geneva Conventions of 1949 and Additional Protocols I and II, the

[63] David Jensen and Silja Halle, **"Protecting the Environment During Armed Conflict"**, United Nations Environment Programme-UNEP, p. 10, November 2009. http://postconflict.unep.ch/publications/int_law.pdf. (07.12.2016).
[64] William H. Boothby, 2009, pp. 23-27.
[65] David Jensen and Silja Halle, 2009, p. 10.

ENMOD convention, Nuclear Non-Proliferation Treaty (NPT), Gas Protocol 1925 and the Protocol IV of CWC are the some examples of the treaties concerning of the LOAC.

Existing some of customary law principles stem from the previous convention and protocols. A rule or provision in the treaty or the treaty may advance to customary law in time. When the rule or provision achieves to customary rule, the rule or provision will bind all states, even if the states are not ratified the treaty.[66]

Since the process of evaluation of the law of weaponry, especially two fundamental principles of the law of weaponry have become prominent as customary principles of the law of weaponry. One of the fundamental principles is the prohibition of superfluous injury and unnecessary suffering; the other fundamental principle is the prohibition of indiscriminate attack. Undoubtedly, these principles have been developed in the historical process. For instance, US environmental manipulations during the Vietnam War, the burning of oil wells in Kuwait by the Iraqi Army in the Gulf War, and the increased environmental awareness in the world community in the last few decades. The principal of the protection of environment and prohibition of the use of environmental weapons have emerged with new customary principles of the law of weaponry. This subject will be assessed under the section of "protection of the environment."

2.1.3. Superfluous Injury and Unnecessary Suffering

The principle of the superfluous injury and unnecessary suffering is one of the fundamental principles of the Law of Armed Conflict. The principle is related to military personnel rather than civilians. The principle is expressed in the Additional Protocol I, Article 35.2: "It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause

[66] William H. Boothby, 2009, pp. 25-27.

superfluous injury or unnecessary suffering."[67] Initially, the principles of the superfluous injury and unnecessary suffering should form a frame for the understanding of past, current and future implications and application of issues related to the law of weaponry.[68] In the modern law of weaponry, an international military commission convened with the invitation of Tsar Alexander II in St. Petersburg. The purpose of the commission was to consider the prohibition of certain exploding bullets. Indeed, the Declaration of St. Petersburg was the first protocol to express banning a specific weapon, mentioning a legitimate object, what states should pursue in the war and be stating most crucial principles of namely superfluous injury.[69]

> *That the progress of civilization should have the effect of alleviating as much as possible the calamities of war;*
> *That the only legitimate object which States should endeavor to accomplish during war is to weaken the military forces of the enemy;*
> *That for this purpose it is sufficient to disable the greatest possible number of men; That this object would be exceeded by the employment of arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable;*
> *That the employment of such arms would, therefore, be contrary to the* laws of humanity…[70]

The negotiators of the Declaration of St. Petersburg stated the concept of useless aggravation of suffering that induces inevitable death to the laws of humanity. The declaration had been a basis of the law of weaponry. The expression of 'Uselessly aggravates the suffering of disabled men…' is meant that superfluous injury and unnecessary suffering principle in the modern law of conflict. In addition to the principles of unnecessary suffering, the preamble expressed that belligerents do not have unlimited power in injuring the enemy. The declaration sets measure to limit the use of power by belligerent against the opponent. The Hague Convention II of 1899 had the same sentiment with

[67] **The 1977 Additional Protocol I to the Geneva Conventions of 12 August 1949,** the Protocol on Relating to the Protection of Victims of International Armed Conflicts (Protocol I), 1125 U.N.T.S. 3, *entered into force* 7 Dec. 1978.
[68] Gary D. Solis, **The Law of Armed Conflict: International Humanitarian Law in War**, Cambridge University Press, Cambridge, 2010, pp. 269-270.
[69] William H. Boothby, 2009, p. 55.
[70] ICRC, Declaration Renouncing the Use, in Time of War, of certain Explosive Projectiles, **The 1868 St. Petersburg Declaration,** https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=568842C2B90F4A29C12563CD0051547C, (21.02.2016).

the former St. Petersburg Declaration with regards to superfluous injury. The next Hague Convention IV of 1907 and the previous Hague Convention II of 1899 had one significant difference about the language of the regulations regarding the use of force by belligerents. Indeed, the difference between the two articles of the declarations was derived from the translation of French expression to English expression.[71]

The Hague Convention II of 1899's Article 23(e) was expressed as follows; "To employ arms, projectiles, or material of a nature to cause superfluous injury". Although the French text was unaltered, the Hague Convention IV of 1907's English translation is different; "To employ arms, projectiles, or material calculated to cause unnecessary suffering".[72]

As can be seen, the difference between the two articles is that 'calculated' and 'superfluous injury 'was substituted with' unnecessary suffering replaced the word 'nature'. This difference was preferred to emphasize the intention of use of weapons instead of nature of weapons.

What is interesting is that with the Article 35(2) of the Protocol I of 1977, the term 'material calculated' was reverted to the 'methods of warfare of a nature' (used in the English version of the Hague of 1899). Moreover, the expressions of 'superfluous injury' and 'unnecessary suffering' are combined with two alternative English coinages in the Article 35(2) (used in the translation of the single French idiom 'maux superflus')[73]; "It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering".[74]

The intended purpose of both superfluous injury and unnecessary suffering is to include both measurable–objective (mostly physical) injury and

[71] William H. Boothby, 2009, pp. 57-58.
[72] ICRC, Declaration (IV,1) to Prohibit, for a Term of Five Years, the Launching of Projectiles and Explosive from Balloons or by Other New Methods of a Similar Nature, **The Hague Conference 1899**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=C372920FFD61039AC12563CD00516126, (21.02.2016).
[73] Yoram Dinstein, 2010, p. 58.
[74] ICRC, Declaration - XIV, Prohibiting the Discharge of Projectiles and Explosive from Balloons, **The Hague Conference 1907**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=79A3374B81C3D30EC12563CD00517745, (02.02.2016).

subjective–psychological suffering. Besides the terms of the superfluous injury or unnecessary suffering are mentioned in the Preamble of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects of 1980.[75]

> *Basing themselves on the principle of international law that the right of the parties to an armed conflict to choose methods or means of warfare is not unlimited, and on the principle that prohibits the employment in armed conflicts of weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.*[76]

Up to now, the development process of superfluous injury and unnecessary suffering is explained in the historical process. However, we need some answers to questions about these terms. What kinds of injury or suffering can be assessed as the principle of superfluous injury or unnecessary suffering? What pain is superfluous? What bitter is necessary? By what yardsticks should we evaluate whether or not the suffering is justified?

Before explaining the subject, some core principles have to be reminded. The principle of customary law of unnecessary suffering is intended to restrain the suffering that exposes enemy combatants. Warfare is the military justified struggle to eliminate enemy forces by massive and decisive force and suffering. Military necessity justifies the infliction of suffering upon enemy combatants. However, military necessity only justifies the infliction as much as necessary to bring about the surrender of enemy forces. Military necessity is the balance between destruction of the enemy and humanity.[77]

The rule of military necessity that covers superfluous injury and unnecessary suffering is related to morality rather than tangible value. The principle dictates the ban of certain weapons. There are very few examples of prohibited use of certain weapons by states. The weapons, such as lances with

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[75] Yoram Dinstein, 2010, pp. 58-59.

[76] ICRC, Preamble of Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May be Deemed to be Excessively Injurious or to Have Indiscriminate Effects, **The Convention on Conventional Weapons 1980**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=056FD614A7D05D90C12563CD0051EC75, (20.02.2016).

[7777] Gary D. Solis, 2010, p. 270.

barbed heads and bayonets with serrated edges, which cause unnecessary suffering are banned in most of the states. Because of the several examples of the weapons prohibited by virtue of unnecessary suffering, there is no any sufficient consensus on what exact term of the rule of prohibiting unnecessary suffering under customary international law.[78] The widely accepted interpretation of superfluous injury and unnecessary suffering based on the international law is to prohibit the use of weapons that increase suffering without really increasing the military advantage. According to the interpretation of the International Court of Justice, the criterion is ‘the harm caused to combatants must not be "greater than that unavoidable to achieve legitimate military objectives”.[79]

According to *Yoram Dinstein*, a weapon should not be merely banned by based on ‘superfluous injury or unnecessary suffering.’ Although certain weapons may cause repulsive effects, this is not enough to render these weapons illegal. If the weapon causes injury or suffering that can be avoided, the weapon can be prohibited. However, there is also confusion between the issue of ‘superfluous injury or unnecessary suffering’ and that of the lethality or non-lethality of the weapon employed. Non-lethal” weapons are designed not to kill but to incapacitate. Non-lethal weapons (e.g., tear gas or rubber bullets) ‘can be fatal under particular circumstances. Moreover, some weapons (like blinding lasers) non-lethal can cause ‘superfluous injury or unnecessary suffering.’[80]

Gary D. Solis emphasizes that;

> *Unnecessary suffering cannot be measured or determined by medical means. It is impossible that objectively define suffering or to give absolute values permitting comparisons between human individuals. Pain, for instance, which is but one of many components of suffering, is subject to enormous individual variations. Likewise, general effects*

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[78] David Turns, Weapons in the ICRC Study on Customary International Humanitarian Law, **Journal of Conflict & Security Law**, Vol. 11, no. 2, 2006, pp. 201–237. doi:10,1093/jcsl/krl010

[79] International Court of Justice (ICJ), “Legality of the Threat or Use of Nuclear Weapons”, **Separate opinion of Judge Guillaume of Advisory Opinion of 8 July 1996**. http://www.icj-cij.org/docket/index.php?sum=498&p1=3&p2=4&case=95&p3=5, (06.03.2016).

[80] Yoram Dinstein, 2010, pp. 59-60.

caused by a local injury are subject to many variables and make the comparison between different individuals difficult.[81]

Due to the reasons explained above, there is no widely accepted consensus on what are the exact essences of 'superfluous injury or unnecessary suffering.' There are three reasons to no consensus; changing assessments with the passing of time, development of weapons technology and advances in medical treatments. With the advances in the medical science, treatments of weapon injuries may improve, and the suffering may be reduced. So, perceived injuries arising from weapons may change over time. With the advances in military technology, military planners may have alternative options that include less damaging methods to achieve particular kinds of military purposes. In the future, weapons may become more discriminating and cultural cognizance, undesirable or repulsiveness as to injuring of weapons may change with the advances in medical treatments.

Unfortunately, suffering is an inevitable end of armed conflict. The purpose of the principle of the superfluous injury or unnecessary suffering has been and remains to be the limitation of suffering in regards to military necessity.[82] *Yoram Dinstein* suggests that the primary concern of the superfluous injury, whether evitable or inevitable in the military operation, is associated with alternative weapons that will cause less injury or suffering.[83] The concept of unnecessary suffering is the principle that forbids destructive acts that are unnecessary to secure a military advantage. Currently, there is a certain resistance to increased protections for enemy combatants. Although the weapon technology has been advanced and became more precise and accurate, the users of the weapons have ignored humanitarian concerns, even if they are often harmful to noncombatants as well as combatants. For example, flame-throwers, white phosphorous munitions and napalm bombs are not prohibited; they remain lawful. Finally, *Gary D. Solis* implied that "Great suffering is not

[81] Gary D. Solis, 2010, p. 272.
[82] William H. Boothby, 2009, p. 68.
[83] David Turns, Weapons in the ICRC Study on Customary International Humanitarian Law, **Journal of Conflict & Security Law**, Vol. 11, no. 2, 2006, p. 201–237. doi:10,1093/jcsl/krl010

the measurement by which a weapon is banned; the question is whether the suffering caused is substantially disproportional to the military advantage gained."[84]

2.1.4. Indiscriminate Weapons

The second fundamental customary principle of the law of weaponry is the prohibition of indiscriminate weapons. According to the Article 51(4) (b) and (c) of the Additional Protocol I, the principle of indiscriminate weapons is based on the definition of what an indiscriminate attack;[85]

> *(b) those which employ a method or means of combat which cannot be directed at a specific military objective; or*
> *(c) those which employ a method or means of combat the effects of which cannot be limited as required by the protocol; and [which], consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.*[86]

Certain military manuals and official documents define the indiscriminate weapons as they have indiscriminate effects both military objectives and civilians indiscriminately, so that cannot distinguish between military objectives and civilians. One of the examples of manuals, the Australian Defense Doctrine Publications ADDP 06.4—Law of Armed Conflict defines indiscriminate weapons:

> ***Indiscriminate weapons*** *is prohibited to employ weapons which cannot be directed at a specific military objective or the effects of which cannot be limited as required by Additional Protocol I (G.P.I) and are therefore of a nature that they may strike military objectives and civilians or civilian objects without distinction or which may be expected to cause incidental loss to civilians or civilian objects which would be excessive in relation to the military advantage anticipated.*[87]

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[84] Gary D. Solis, 2014, p. 272.
[85] William H. Boothby, **Conflict Law: The Influence of New Weapons Technology, Human Rights and Emerging Actors**, TMC Asser Press, The Hague, 2014, pp. 159-160.
[86] ICRC, Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, **The Geneva Conventions Additional Protocol I Article 1,** https://www.icrc.org/applic/ihl/ihl.nsf/ART/470-750065?OpenDocument, (06.03.2016)
[87] Australian Defense Force, Australian Defense Doctrine Publications **ADDP 06.4** Law of Armed Conflict, Defence Chapter 4 Weapons, Publishing Service, Canberra, 2006, pp. 4-3.

As mentioned above that most frequently referred two criteria are set out in the Additional Protocol I. The Article 51(4) (b) forbids the weapons which cannot be directed at a specific military objective. Moreover, the Article 51(4) (c) bans the weapons the effects of which cannot be limited as required by the Protocol. Besides several military manuals and official statements, the International Court of Justice (in the Nuclear Weapons Case)[88] and several States allege that it is an indiscriminate weapon, if it has unavoidable effects or if the devastation of it would cause unexpected results and incidental civilian losses which are compared to expected military advantage extreme.[89]

William H. Boothby pointed out that the explanation in the Additional Protocol I: The Article 51(4), which not only refers to actions of indiscriminate attacks but also refers to methods and means of combat. *Boothby* interprets the subparagraph (b) as weapons must have the capability of discriminate use. Explicitly he thinks that the subparagraph (c), as to concerning the legitimacy of weapons, made the inference that it prohibits the use of weapons whose effects cannot be limited. The rule of discrimination of weapon is formulated in the AP I, according to which "weapons must be capable of direction at specific military objectives, and their effects must be the limitation as required by law."[90] Another crucial foundation of the prohibition of indiscriminate weapons is the Advisory Opinion of 8 July 1996 about the Legality of The Threat or Use of Nuclear Weapons. According to the Opinion Article 78:

> *The first is aimed at the protection of the civilian population and civilian objects and establishes the distinction between combatants and non-combatants; States must never make civilians the object of attack and must consequently never use weapons that are incapable of distinguishing between civilian and military targets.*[91]

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[88] International Court of Justice (ICJ), Legality of the Threat or Use of Nuclear Weapons Article 78, **Advisory Opinion of 8 July 1996 by International Court of Justice**, http://www.icj-cij.org/docket/files/95/7495.pdf, (06.03.2016).

[89] Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel, **Nuclear Weapons under International Law**, Cambridge University Press, Cambridge, 2014, pp. 99-101.

[90] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, pp. 77-78.

[91] International Court of Justice (ICJ), Legality of the Threat or Use of Nuclear Weapons Article 78, **Advisory Opinion of 8 July 1996 by International Court of Justice**, http://www.icj-cij.org/docket/files/95/7495.pdf, (06.03.2016).

The judges of the International Court of Justice in the *Nuclear Weapons Case* mentions that “nuclear weapons are indiscriminate because they are weapons whose effects cannot be limited and the widespread destruction caused by the weapon both in time and in space.” In addition to nuclear weapons, according to a resolution adopted in the UN General Assembly in 1969, biological and chemical weapons are evaluated as indiscriminate weapons because of their uncontrollable and unpredictable effects.[92]

The following weapons are certainly enough examples to understand the issue of indiscriminate weapons much better: chemical, biological and nuclear weapons; anti-personnel landmines; mines; poisons; explosives discharged from balloons; V-1 and V-2 rockets; cluster bombs; booby-traps; Scud missiles; Katyusha rockets; incendiary weapons; and environmental modification techniques. Although there is no consensus on the matter, it is generally accepted that these weapons infringe the rule of prohibition to use indiscriminate weapons. More information and details as to these weapons will be given below.[93]

After the exact definitions of indiscriminate weapons in terms of manuals, protocols, and opinions, I should answer the question of what indiscriminate weapons technically are. It is accepted that if any weapon has obsolete and unreliable guidance system and if planner or executor of air attack cannot predict where the exact strike point of the weapons system is (for example long-range missile or rockets), then the weapons are inherently indiscriminate and therefore unlawful. V1 or V2 rockets or Scud missiles[94] are well-accepted historical instances of indiscriminate weapons.[95]

However, some precise weapons may be used indiscriminately. If without engagement rules, precise weapons are aimed beyond its effective

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[92] Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel, ***Nuclear Weapons under International Law***, Cambridge University Press, Cambridge, 2014, pp. 99-101.
[93] ICRC, “Rule71. Weapons That Are by Nature Indiscriminate”, **Rules of Customary International Law by Study on Customary International Humanitarian Law Conducted by ICRC**, https://www.icrc.org/customary-ihl/eng/docs/v1_rul_rule71#Fn_31_39, (03.03.2016).
[94] SCUD Missile is surface-to-surface, short range and Soviet designed missile.
[95] Matthew C. Waxman, “International Law and the Politics of Urban Air Operations”, RAND Corporation, Washington D.C. 2000, pp. 13.

operative range and altitude, these weapons may be evaluated as indiscriminate weapons. However, certain weapons are more prone to indiscriminate use than others such as anti-personnel mines, cluster munitions, chemical, biological weapons, according to the international law. The judgment in the *Martić case* of the International Criminal Tribunal for the former Yugoslavia ICTY's Trial Chamber[96] in concern with the firing of cluster munitions against Zagreb in May 1995 is significant in this sense. The Trial Chamber found that the M-87 Orkan is an indiscriminate weapon because of its payload (each rocket warhead carries 288 to 420 submunitions) and incapable of hitting specific targets. The weapon M-87 Orkan[97] was fired from its extreme range to Zagreb's densely populated civilian areas; the attack led to many casualties. In conclusion, the M-87 Orkan was used as an indiscriminate weapon.[98]

According to the *Study* on customary international humanitarian law that prepared by the definition of the indiscriminate weapon is referred to documents such as the AP I Article 51(4)(b) and Article 51(4)(c), Nuclear Weapon Case, *Martic Case* of the International Criminal Tribune for the Former Yugoslavia instead of the absolute definition of the indiscriminate weapons.[99] Moreover, the prohibition of indiscriminate attacks is also explicitly included in the *Study*.[100] Moreover, with reference to interpretation of the Rome Statute the definition of indiscriminate weapon is that "Employing weapons ….which are inherently indiscriminate in violation of the international law of armed conflict, provided that such weapons, projectiles and material and methods of warfare are the subject of a comprehensive prohibition and are included in an annex to this Statute".[101] Besides, the Additional Protocol I and the ICC (International Criminal Court) Statute cover only international armed

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96 Judgement, **Milan Martic** (IT-95-11-A ICTY), Appeals Chamber, 8 October 2008.
97 The **M-87 Orkan** is a Yugoslavian self-propelled multiple rocket launcher.
98 Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel, ***Nuclear Weapons under International Law***, Cambridge University Press, Cambridge, 2014, pp. 99-101.
99 Judgement, **Milan Martic** (IT-95-11-A ICTY), Appeals Chamber, 8 October 2008.
100 Jean-Marie Henckaerts, Louise Doswald-Beck, and Carolin Alvermann. General Principles on the Use of Weapons, **Customary International Humanitarian Law.** Vol. I, Chapter 20, Cambridge University Press, Cambridge, 2005.
101 International Criminal Court (ICC), "**Rome Statute of the International Criminal Court",** Article 8b (xx), (17.07.1998).
http://legal.un.org/icc/statute/99_corr/cstatute.htm, (18.08.2016).

conflicts, whereas the *Study* pointed out that the rule of indiscriminate weapons is applicable in all armed conflicts. The rule of the prohibition of indiscriminate attacks has been extended to apply to non-international armed conflicts, as well.[102]

Pertaining to the use of indiscriminate weapons in armed conflict will be elaborated under each weapon title. Besides the definitions of indiscriminate weapons, the precautions for the prevention of civilian causalities should be taken into account. Planners and executors of the air strike should take into consideration all possible effects, results of attacks, and weapons prior to air strike. They should take all feasible precautions in their choice of means of attack and in using the equipment and particular weapons such as laser-guided bombs, missiles rather than the unguided weapons. The avoidance and minimization of collateral damage are responsibilities of executors and planners of air attacks. Weapon producers also have the responsibility to take into consideration the rule of indiscriminate weapons. They should elaborate and predict the effects of weapons and whether infringe international law or not.[103]

2.1.5. Protection of the Environment

Environmental destruction should be evaluated as a natural consequence of wars. There are several historical examples of important environmental damage happening during conflicts.[104] The first and the most detrimental act of environmental warfare in history was the destruction of the Huayuankow dam in China in 1938. The National Chinese Army attempted to prevent the rapid advance of Japanese Imperial Army into the territory of China. The National Chinese Army managed to breach the dam. The flooding devastated the enormous geographic area and caused over the loss of 800,000

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[102] David Turns, Weapons in the ICRC Study on Customary International Humanitarian Law, **Journal of Conflict & Security Law**, Vol. 11, no. 2, 2006, p. 201–237. doi:10,1093/jcsl/krl010

[103] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, pp. 79-80.

[104] William H. Boothby,2009, p, 87.

lives because of flooding, illness, and famine.[105] In another instance, Germany occupied the Dutch lands by means of flooding during the Second World War.[106] The United States used chemical herbicides, commonly known as Agent Orange, in a massive defoliation campaign and manipulated the routes of rivers to prevent advances of the Vietnamese. Severe and long-lasting damage to the environment of Vietnam became the basis of the 1976 Environmental Modification Convention (ENMOD) and the inclusion of environment provisions in the 1977 Additional Protocol I.[107]

There are two major treaties, and four additional documents, including ENMOD Convention, AP I, The Rome Statute, the CWC Convention, CCW Convention and the ICRC Guidelines for Military Manuals, which are directly related to the protection of the environment in international armed conflict.[108]

2.1.5.1. ENMOD Convention

The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD) was adopted on 10 December 1976 and entered into force on 5 October 1978. In fact, the public opinion for the protection of the environment during the 70s influenced many states to regulate the use of environmental modification techniques. The United States, especially during the Vietnam War, adopted methods and means of environmental modification techniques to destroy crops and forests, and it attempted to manipulate the weather in Indo-China with muddying and flooding the land routes in North Vietnam.[109]

Article I (1) of the ENMOD Convention prescribes:

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105 Robert A. Francis, 2011. "The Impacts of Modern Warfare on Freshwater Ecosystems.", **Environmental Management,** Vol. 48, no. 5, 2011, pp. 985-99. doi:http://dx.doi.org/10.1007/s00267-011-9746-9.

106 William H. Boothby, p, 87.

107 Carson Thomas, “Advancing the Legal Protection of the Environment in Relation to Armed Conflict: Protocol I’s Threshold of Impermissible Environmental Damage and Alternatives. **Nordic Journal of International Law**, Vol. 82, no. 1, 2013, p. 83-101. doi:10.1163/15718107-08201005

108 Yoram Dinstein, 2010, p. 177.

109 William H. Boothby, 2009, p, 92.

Each State Party to this Convention undertakes not to engage in military or any other hostile use of environmental modification techniques having widespread, long lasting or severe effects as the means of destruction, damage or injury to any other State Party.[110]

According to *William Boothby*, in the Article one: the term ‘widespread’ can be evaluated as ‘‘surrounding an area on the scale of several hundred square kilometers’’, while ‘long-lasting’ means to involve ‘‘lasting for a period of months, or approximately a season’’ and ‘severe’ implies ‘‘serious or significant disruption or harm to human life, natural and economic resources or other assets’’. *William Boothby* states that the weather can be used to modify to increase or reduce rainfall, in order to cause floods or drought.[111]

Article II of the ENMOD Convention expresses:

As used in Article I, the term ‘environmental modification techniques’ refers to any technique for changing – through the deliberate manipulation of natural processes – the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space.[112]

The ENMOD Convention Article II refers to the comprehensive description of environmental modification techniques: such as earthquakes; tsunamis; an upset in the ecological balance of a region; changes in weather patterns (clouds, precipitation, etc.), changes in climate patterns, in ocean currents, changes in the state of the ozone layer, and changes in the state of the ionosphere all of which can be evaluated as environmental modification techniques.[113] This issue will be discussed in more detail below.

William Boothby argues that there are two important factors that should be mentioned. The first factor is that the convention refers to the use of the environment as a weapon. The second factor is that the convention describes ‘widespread, long-lasting or severe’ effects as alternative elements of environmental modification techniques. In case of occurrence of any of these

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[110] ICRC, Convention on the prohibition of military or any hostile use of environmental modification techniques, 10 December 1976, **ENMOD Convention Article I,** https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=2771DB89FF11D8B4C12563CD0051FB44, (08.03.2016).

[111] William H. Boothby, **Conflict Law: The Influence of New Weapons Technology, Human Rights and Emerging Actors**, TMC Asser Press, The Hague, 2014, p. 161.

[112] ENMOD Convention Article II.

[113] Yoram Dinstein, 2010, p. 178.

elements, the convention prohibits any military and hostile use of environmental modification techniques. The convention of ENMOD is not customary law because its prohibition is limited only to its parties, not all states.[114]

2.1.5.2. Additional Protocol I

The aim of the Additional Protocol I was intended to reaffirm and develop to Law of Armed Conflict (LOAC). The Additional Protocol I is composed of 102 Articles. Especially two provisions became prominent in conducting the protection of environment during international armed conflict. These provisions are the Article 35(3) and the Article 55.[115]

The Article 35(3) prescribes that:

> *It is prohibited to employ methods or means of warfare which are intended or may be expected, to cause widespread, long-term and severe damage to the natural environment.*[116]

The Article 55 prescribes that:

> *Care shall be taken in warfare to protect the natural environment against widespread, long-term and severe damage. This protection includes a prohibition of the use of methods or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population.*
> *Attacks against the natural environment by way of reprisals are prohibited.*[117]

The Articles of 35(3) and 55 aim to protect the natural environment during international armed conflict. Although ENMOD was the first treaty to regulate protective convention about the environment, the Additional Protocol I put new two perspectives. As mentioned above, the Article 35(3) involves not only party states' territory but also the whole environment. Furthermore, the Article 55 describes and defines the protection of the environment. *William Boothby* refers to the ICRC Commentary on AP I that these provisions prohibit

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[114] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, pp. 93-94.
[115] Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel, **Nuclear Weapons under International Law**, Cambridge University Press, Cambridge, 2014, pp. 250-251.
[116] ICRC, Basic Rules, **Additional Protocol I Article 35(3)**.
[117] ICRC, Protection of Natural Environment, **Additional Protocol Article 55.**

any means or method of warfare, which is planned, or may be expected, to cause severe environmental damage. Moreover, these provisions prohibit 'any method of conventional or unconventional warfare which, by collateral effects, would cause widespread and severe damage to the natural environment as such, whenever this may occur over a period of decades.'[118] Another critical interpretation is the ICRC Commentary of basic rules in the paragraph 1454.

> *The time or duration required (i.e. long-term) was considered by some to be measured in decades. References to twenty or thirty years were made by some representatives as being a minimum. Others referred to battlefield destruction in France in the First World War as being outside the scope of the prohibition…. It appeared to be a widely shared assumption that battlefield damage incidental to conventional warfare would not normally be proscribed by this provision. What the article is primarily directed to is thus such damage as would be likely to prejudice, over a long term, the continued survival of the civilian population or would risk causing it major health problems.*[119]

The initial point in the Commentary is the given time and duration period of damage. On the contrary, to the ENMOD Convention, the meaning of long-term refers to decades of minimum twenty and thirty years. The other interpretation of the Reporter who *Antoine Bouvier* is that not only the severe environmental damage is occurred, but also civilian population should be under the severe threat and survival at stake, the provision will be violated under these circumstances.[120] Even armies like the United States, the United Kingdom or Australian Army interpret and attach provisions of protection of environment in their treaties. For example, the Australian Army mentions the issues of environmental in the armed conflicts. The publication of 'The Law of The Armed Conflict' by the Australian Defense Force describes:

> *The natural environment is not a legitimate object of attack. Destruction of the environment, not justified by military necessity, is punishable as a violation of international law.*
> *It is prohibited to employ methods or means of war which cause widespread, long term and severe damage to the environment or may be*

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[118] William H. Boothby, 2009, p, 96.
Note: Antoine Bouvier is a member of the ICRC Legal Division. He issued the review of the Protection of the Natural Environment in Time of Armed Conflict, 31.12.1991.
[119] Report CDDH/215/Rev.1 para 27 reported in ICRC Commentary, para 1454.
[120] William H. Boothby, 2009, p, 96.

expected to cause such damage and prejudice the health or survival of the population.[121]

The ENMOD Convention and Protocol I was adopted to achieve different purposes. *Yoram Dinstein* determines the dissimilarities between them; initially, while the Protocol I identifies no distinction between enemy territory and the territory of the belligerent causing environmental destruction. The ENMOD Convention includes only international armed conflicts. Secondly, the Protocol protects the environment ('the environment as victim'), whereas the ENMOD Convention protects from manipulation of the environment ('the environment as weapon'). However, there is an important detail in the texts. The Protocol I protects the natural environment not only against intentional infliction of damage during the war but also against 'purely unintentional and incidental damage which can be expected'.[122] Thirdly, on the contrary to the Protocol I, the ENMOD Convention prohibits intentional modification of the environment. Thus, ENMOD has very limited application to the conduct of conventional warfare.[123] One of the three criterions under the ENMOD Convention ('widespread, long-lasting *or* severe effects') can be insufficient for infringement of the convention, however, under the Protocol, all three conditions must be satisfied simultaneously. The final difference is that the ENMOD Convention refers to the meaning of 'long-lasting' that endures 'for a period of months, or approximately a season'; and 'severe' involves 'serious or significant disruption or harm to human life, natural and economic resources or other assets'. However, for the Protocol I, the term of the "long-term" was interpreted as a scale of decades.[124]

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[121] Australian Defense Force, Australian Defense Doctrine Publications **ADDP 06.4** Law of Armed Conflict, Defence Chapter 4 Weapons, Publishing Service, Canberra, 2006, pp. 5-13.
[122] Yoram Dinstein, 2010, pp. 189-190.
[123] Carson Thomas, p. 90.
[124] Yoram Dinstein, 2010, pp. 189-191.

2.1.5.3. The Rome Statute

The third relevant text is the Rome Statute Article 8(2)(b)(iv) of the 1998 Rome Statute of the International Criminal Court which condemns it as a war crime:

> *Intentionally launching an attack in the knowledge that such attack will cause incidental loss of life or injury to civilians or damage to civilian objects or widespread, long-term and severe damage to the natural environment which would be clearly excessive in relation to concrete and direct overall military advantage anticipated.*[125]

According to *Yoram Dinstein*, the Statute emphasizes on condition that in both intention and knowledge of the conclusion of the attack, and the damage to the natural environment must be clearly excessive in relation to the military advantage anticipated. The war crime will be considered. The second difference is that a balance must be provided between the military advantage anticipated and any incidental injury to civilians or civilian objects (as natural environment).[126]

2.1.5.4. The Conventional Weapons Convention

The fourth is the Conventional Weapons Convention of 1980. The text of the Article 35(3) of the Protocol I (that it is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread…. natural environment.) is repeated verbatim in the preamble of the Conventional Weapons Convention. This article prohibits any attacks by means of incendiary weapons except military advantage anticipated against flora. The Article 2(4) of the Protocol III, annexed to the Convention, stipulates that; “It is prohibited to make forests or other kinds of plant cover the object of attack by incendiary weapons except when such natural elements are used to

[125] Rome Statute of the International Criminal Court, 1998, 37 *ILM* 999, 1006 (1998).
[126] Yoram Dinstein, 2010, pp. 185-186.

cover, conceal or camouflage combatants or other military objectives, or are themselves military objectives".[127]

2.1.5.5. The Chemical Weapons Convention

The last of environmental protection document is the Chemical Weapons Convention of 1993. The seventh paragraph of the preamble of the Convention emphasizes that "Recognizing the prohibition, embodied in the pertinent agreements and relevant principles of international law, of the use of herbicides as a method of warfare." The CWC prohibits only the use of herbicides for the military purpose during the conflict.[128] Initially, the use of herbicides for military purposes was used for the denial of forest cover, for the destruction of food plants, and for the decimation of industrial crops. Vast areas of forest and cropland were sprayed from the air in South Vietnam, particularly during the years 1966 through 1969.[129]

From the viewpoint of *Dinstein*, 'widespread, long-lasting or severe' environmental damage is a precondition. The use of herbicides by the US during the Vietnam War might not cause environmental damage because of the insufficient requirements, in such a case it would not be a breach of the ENMOD Convention.[130] Conversely, *Arthur H. Wasting* assessed a different perspective that employment of herbicides in the Vietnam. The use of herbicides led to the severe weakening of local ecosystems: (a) by so-called nutrient dumping; (b) by the destruction of the vegetation; and (c) by the loss of the animal community, by means of habitat destruction. Finally, when an

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[127] ICRC, Article 2(4) of Protocol III Protection of Civilians and Civilian Objects, **Protocol on Prohibitions or Restrictions on the Use of Incendiary Weapons, Geneva, 10 October 1980**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=14FEADAF9AF35FA9C12563CD0051EF1E, (11.03.2016).
[128] Yoram Dinstein, 2010, p. 185-186.
[129] Arthur H. Westing, **Pioneer on the Environmental Impact of War**, Springer, London, 2013, p.43.
[130] Yoram Dinstein, 2010, p. 187-188.

herbicidal attack is used to destroy either food or industrial crops, this can lead not only to ecological damage but also to social damage.[131]

2.1.5.6. The ICRC Guidelines for Military Manuals

The other contributing document mentioned by *William Boothby* in his book “The Weapons and the Law of Armed Conflict is the ICRC Guidelines for Military Manuals”. ICRC includes a guideline for armed forces on the protection of the environment during the armed conflicts.[132] The Guidelines for Military and Instructions on the Protection of the Environment in Times of Armed Conflict were published in the International Review of the Red Cross on 30 April 1996. The guidelines are summaries of the existing applicable international rules which must be known and respected by members of the armed forces.[133] A more comprehensive study by ICRC is the Customary International Humanitarian Law book. This study covers all the issues about the law of armed conflict. The study prescribes a total of 161 specific rules about the law of armed conflict. The topic of the natural environment (Chapter 14) is mentioned in the Rule 43, 44 and 45. Each rule is elaborated and described in detail in the study.[134]

Consequently, the fundamental principles of the law of weaponry the must be taken into consideration by planner and executors of air strikes. Otherwise, according to the continuity and severity of the violation of the principles, the air force may suspend air campaigns, may face international sanctions and accusations. For instance, the Case of Kerimova and Others v. Russia, European Court of Human Rights convicted the Russia because of the 3 May 2011. The Russian Air Force carried out air strikes against ‘densely

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[131] Arthur H. Westing, p. 46.
[132] William H. Boothby, 2009, p, 97.
[133] ICRC, Guidelines for Military and Instructions on the Protection of the Environment in Times of Armed Conflict, **ICRC Resource Center, International Review of Red Cross**, no. 311, 30.04.1996,
https://www.icrc.org/eng/resources/documents/misc/57jn38.htm#a2, (13.03.2016).
[134] Jean-Marie Henckaerts, Louise Doswald-Beck, and Carolin Alvermann. **Customary International Humanitarian Law.** Vol. I, Chapter 14, Cambridge University Press, Cambridge, 2005.

populated settlement of Urus-Martan that a town in Chechnya between 2 and 16 October 1999. Because of the by taking into consideration of the core principles of the law of weaponry, after the air campaigns, dozens of people killed and wounded and destruction of the private properties. The court convicted the Russia of pay compensation to the victims and their relatives.[135]

Moreover, disregarding of the environment during the air strikes, air attacks caused many environmental disasters, during the Vietnam War The use of the toxic herbicide Agent Orange caused massive deforestation and chemical contamination. Furthermore, The Iraqi army intentionally destroyed the over six hundred oil wells and set them to the fire. The cost of this environmental disaster has exceeded 80 billion dollars. Another example is in Kosovo War. The destruction of the dozens of industrial plant causes the chemical contamination. To be addressed in more detail in the next unit, Depleted Uranium (DU) Munitions had been used many times by aircrafts against armored vehicles. Result of the DU contamination many sites has been decontaminated. Eventually, the planner and the executor of air assault should consider the possible environmental consequences of post-attack air strikes.

2.2. THE LAW OF TARGETING

One of the fundamental principles of the law of armed conflict is the protection of civilians from the effects and results of armed conflicts. With the development of the modern armed conflict, the humanitarian concerns have increased in the last decades. Especially after the Second World War, owing to the bitter experiences, new conventions and articles was needed for regulating the protection of civilians and developing new terms for the distinction of combatants from civilians.

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[135] European Court of Human Rights-ECHR, "**Case of Kerimova and Others v. Russia**", the application no. 17170/04, 20792/04, 22448/04, 23360/04, 5681/05, 5684/05, Judgment, 03.05.2011.
http://hudoc.echr.coe.int/eng?i=001-104662, (07.02.2016).

2.2.1. Military Targeting Rules

The modern law of armed conflict defines the fundamental principles of the distinction between combatants and civilians. For the first time, the definition of the military objective can be seen in the draft *Hague Air Warfare Rules of 1923.* A military objective is defined as a target that the total or partial destruction would constitute an obvious military advantage for the belligerent and military objectives. Military objectives can include military forces, military works, military establishments or depots, manufacturing plants constituting important and well-known centers for the production of arms, ammunition or characterized military supplies, lines of communication or of transport which are used for military purposes. As mentioned above, states did not adopt the draft Hague Air Warfare Rules of 1923. This definition was not accepted until the Geneva Convention of 1949.[136] Eventually, the combatants are assumed as somebody who can attack enemy forces, targets and kill, injure or destroy them through concrete materials. On the contrary, to combatants, civilians are not assumed to be in the conflicts; as they are not involved in the conflicts.

Civilians should be protected from the effects of wars. The Law of Armed Conflict (LOAC) in terms of not only life and health but also dignity protects an enemy civilian who does not participate actively in the conflict.[137] The Geneva Convention of 1949 provides protection for civilians during the international armed conflict, yet the Geneva Convention of 1949 does not give a definitive term for "civilian". Until the Additional Protocol I of 1977, civilians did not have any comprehensive description in the related conventions.[138] According to the Article 50 of the Additional Protocol I, "a civilian is any person who is not commanded by a person responsible for his

[136] William J. Fenrick, Applying IHL Targeting Rules to Practical Situations: Proportionality and Military Objectives, **Windsor Yearbook of Access to Justice**, Vol. 27, no. 2, 2009, pp. 271.
[137] Yoram Dinstein, **The Conduct of Hostilities under the Law of International Armed Conflict,** 2nd Edition, Cambridge University Press, Cambridge, 2010, pp. 27-29.
[138] The Judge Advocate General's Legal Center and School, William J. Johnson, Anew D. Gillman, **Law of Armed Conflict Deskbook: 2012**, Createspace Independent Pub, Virginia, 2014, p. 90.

subordinates, having a fixed distinctive sign recognizable at a distance and, carrying arms openly to conduct their operations under the laws and customs of war."[139]

After the definitions of combatants and civilians according to the Law of Armed Conflict, the planners, and executors of the air campaign should distinguish between combatants and civilian target in the conflict. They must carry out their air operations on the military targets. Unless civilians become active actors in the conflicts, they should not be targeted as military objectives and should be protected from the effects of an air strike. The Additional Protocol I imposes the belligerents not to use civilians as shields from enemy attacks. In fact, belligerents are obligated to remove civilian populations from the theatre of war to a safe range. In the same time, belligerents should not deploy their military forces in or near civilian population areas to protect them from possible enemy military actions. Lastly, starving civilians is prohibited by the Additional Protocol I. AP1 also bans the use of weapons or means of warfare, to cause widespread, long-term, and severe damage to the environment.[140] The issue of protection of environment and use of environmental weapons was explained in detail in the previous section.

2.2.2. Proportionality

Proportionality is concerned with the law of targeting when belligerents carry out an air strike on the hostile military objective. If the air strike induces the anticipated collateral or incidental loss of life, injury to civilians, and damage to civilian objects, the belligerent's air strike to achieve military advantage is assessed as excessive or disproportionate military action.[141] Accidentally, during the conflicts, belligerents have targeted civilians. In such

[139] ICRC, Definition of Civilians and Civilians Population Article 50, **Additional Protocol I 1977**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=E1F8F99C4C3F8FE4C12563CD0051DC8A, (10.02.2016).
[140] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, pp. 42-47.
[141] William J. Fenrick, p. 276.

cases, civilians may be employed in military facilities or in a driving car near the military objective. In many countries, civilians may dwell near military targets. Other factors could be the malfunction of weapon systems, bad weather conditions, and faulty intelligence. Because of these factors, an air-dropped bomb, air to ground missile or another strike system may damage or destroy civilian targets and civilians may suffer from the air strikes. Similar examples of such circumstances happened in the Gulf Wars, Afghanistan, and the Kosovo Operation in 1999. Indeed, before the conclusion of AP I, there was no treaty provision on the regulation of the rule of proportionality in combat. When the attack was carried out on a military objective, civilians or civilian objects were accepted as negligible collateral damage.[142]

The principle of proportionality is implicitly given in the Article 51 of AP I: “an 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.” The limit of excessiveness in AP I is based on disproportionality. The definition of proportionality refers to achieving military superiority with negligible civilian losses.[143]

A typical example of the principle of proportionality is that there is a single enemy sniper in the village which civilians resides, the belligerent carries out the air campaign on the whole village by means of air raid. Of course, all of the village would be destroyed because of the disproportionate air strike. Most of the village residents would be killed to eliminate a single enemy sniper. Contrary to this example, if there was an artillery battery in the village, collateral damage might have been warranted. Even if not an air campaign, the Lusitania event in the First World War is another good example. Although the ship carried both military and civilian personnel with civilians, after the strike of German U-Boat, hundreds of civilians would be death. This is no an acceptable incident according to the law of targeting and conflict.[144] At the

[142] Yoram Dinstein, 2010, p. 119.
[143] William J. Fenrick, p. 277.
[144] Yoram Dinstein, 2010, pp. 122-123.

present, with the development of new high precise weapons system, belligerents have many options to choose from different weapons on the specific targets such as laser, GPS, optic, infrared guided air munitions, etc. These kinds of precise weapons have managed to minimize civilian casualties in the battlefields.

2.2.3. Indiscriminate Attacks

The direct and deliberate air strike against civilians and civilian targets are definitely prohibited. Nevertheless, the Additional Protocol I also prohibits indiscriminate attack against military targets. If indiscriminate air assault causes civilian casualties, this insensitive and reckless behavior brings responsibility for the attacker states. It is considered an indiscriminate attack, even if attacker state does not have the intention to harm civilians, but it induces collateral damage because of its reckless, emotionless aggression.[145]

Initially, indiscriminate bombardment of the civilian population' was mentioned in the (non-binding) Hague Rules of Air Warfare of 1923, but the primary binding treatment was adopted with the Article 51(4) of the Additional Protocol. The Additional Protocol I defines indiscriminate attacks as;

> *(a) those which are not directed at a specific military objective;*
> *(b) those which employ a method or means of combat which cannot be directed at a specific military objective; or*
> *(c) those which employ a method or means of combat the effects of which cannot be limited as required by this Protocol; and consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.*[146]

The article does not involve any action of attacker but also refers to methods and means of combat. The Article 51(5) of the Additional Protocol gives two specific examples to explain indiscriminate attack:[147]

> *(a) an attack by bombardment by any methods or means which treats as single military objective a number of clearly separated and distinct*

[145] Alexandra Boivin, "The Legal Regime Applicable to Targeting Military Objectives in the Context of Contemporary Warfare", **Research Paper Series of University Center for International Humanitarian Law,** No. 2, 2006, pp. 32-33.
[146] Yoram Dinstein, 2010, pp. 116-117.
[147] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 78.

military objectives located in a city, town, village, or other area containing a similar concentration of civilians and civilians' objects and an 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 anticipated.[148]

2.2.3.1. Scenario of Indiscriminate Attack

In relation to the articles (a), the drafters of the Protocol exemplified this article (a) for clarification of indiscriminate attacks. In order to further clarify this issue, the following case scenario can be given in which there is a military target composed of five buildings located in the civilian settlement. Nevertheless, the belligerent has the destruction capability of attacking ten or more building. Definitely, the belligerent will cause civilians casualties after the air strike. This kind of air assault breaches the Article 51(5a). Technically, the Air Force could target with GBU-12 laser-guided bomb (500 lb. MK-82 GP[149] warhead) these five building blocks, instead of this application. If the air force attacks with two MK-84 General Purpose bombs[150] (2000 lb.) to destroy military target, the attacker state breaches the AP I Article 51(5a). Because two MK-84 have more destruction capability than one GBU-12 laser guided bomb and they don't have precise and high accuracy to hit targets. The result of such explosion of two MK-84 would be the destruction of more than five buildings and loss of lives of many civilians. Hence, this last example is related to the second clause of the Article 51(5b) as 'An 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.'

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[148] ICRC, Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts, **Additional Protocol I 1977**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=4BEBD9920AE0AEAEC12563CD0051DC9E, (15.02.2016) .

[149] The **MK 82** is an unguided, 500 liber, and low-drag general-purpose U.S. **bomb.**

[150] The **MK 84** is an unguided, 2000 liber, low-drag general-purpose U.S. **bomb.**

2.2.3.2. The Justification of Indiscriminate Attack

In addition to state responsibility, a person may be found guilty in the case of violation of the discrimination principle. For example, one of the justifications of the persecutor v. Tadic case is the indiscriminate attack on Kosarac Town in Bosnia. The indiscriminate attack was carried out between 25 and 27 May 1992, in which one of the commander was the Dusko Tadic. Serbian Forces carried out intense and indiscriminate artillery fire on the residents of the Kosarac Town. During the attack, the Serbian Forces killed more than 800 civilians. Therefore, The International Criminal Tribunal for the former Yugoslavia (ICTY) sentenced Dusko Tadic to twenty years sentence on 11 counts of crimes against humanity and war crimes on 15 July 1999.[151] The significant point is that ICTY attributed its judgment based on serious violations of the Law of Armed Conflict because of violations of the provisions of the Geneva Conventions and principles of customary law.[152]

Given the examples of such indiscriminate principles, the planners and executors of air attack should consider the position of military targets whether they are too close and/or not. Moreover, the air assault planners and executors should review the possible results of strike in terms of collateral damage and military target. The executor and planner of air raid should also take precautions and should choose feasible weapons and methods to minimize the risk of collateral damage. On the other side, the defender states also have responsibility to take precautions to avoid loss of civilian citizens because of possible indiscriminate or disproportionate attacks by belligerents.[153]

The following specific circumstances are prohibited by indiscriminate principles of AP I:

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[151] Judgment, **Tadic Case** (IT-94-1-AR72 ICTY), Appeals Chamber, 2 Oct.1995,

[152] Sassòli, Marco, and Laura M. Olson, "The Judgment of the ICTY Appeals Chamber on the Merits in the Tadic Case" **International Committee of Red Cross (ICRC)**, no. 839, 30.09.2000.
https://www.icrc.org/eng/resources/documents/article/other/57jqqc.htm. (09.12.2016)

[153] William H. Boothby, 2009, p. 78

> *(a) To fire blindly – there is no concrete idea about the nature of the target into enemy territory (this circumstance should not be confused by the 'harassing fire' or 'interdiction fire' for identification of enemy military targets;*
> *(b) After the failure of attack on original target, random air bombardment over the enemy territory;*
> *(c) If the visibility is too limited in the lack of target acquisition system, to carry out air bombardment at night, bad weather or from extremely high altitudes*
> *(d) To carry out military strike with unguided missiles against military objectives located civilians' population.*

In the war history, the use of the first ancestor of a missile during the Second World War was an embodiment of such an indiscriminate attack. The German V-1s and V-2s missiles had high circular error probability (CEP) to hit targets. They did not have precise guidance systems to aim at a specific military objective. The German Air Force (Luftwaffe) launched these missiles to large urban centers such as London. As a result, these missiles breached the principles of indiscriminate attacks resulting in the loss of civilian lives.[154]

[154] Yoram Dinstein, 2010, p. 118.

CHAPTER THREE

THE PROHIBITED WEAPONS

3.1 CONVENTIONAL WEAPONS

Conventional weapons cause damage due to their explosive or kinetic force such as bullets, bombs, mortars, and grenades.[155] The law of armed conflict (LOAC) has traditionally approached the regulation and control of conventional weapons from two different but complementary directions. The first is the prohibition of particular weapons; the second is the restriction of the use of weapons by reference to their wounding effects.[156] When weapons or types of weapons, such as projectiles of a given shape, velocity or effect, they are presumed to cause unnecessary suffering to combatants. As a result, they must be banned altogether.[157] Such weapons should not be used when they indiscriminately affect both combatants and non-combatants.[158]

3.1.1 Treaties

The initial efforts to make rules to restrict or prohibit the use of a specific weapon started in the second half of the 19th century. The regulations concerning specific weapons have emerged both humanitarian and security concerns.[159] After the industrial revolution, new improved, more lethal and destructive weapons had been used by states in the conflicts.

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[155] Mika Hayashi, **"**The Convention on Cluster Munitions and the Clearance of Cluster Munitions Remnants: Whose Responsibility, and How to Ensure Effective Implementation?", **International Humanitarian Legal Studies,** Vol. 3, no. 2, 2012, pp. 322-343.
[156] J. McClelland, "Conventional Weapons: A Cluster of Developments", **The International and Comparative Law Quarterly**, Vol. 54, no. 3, July 2005, pp. 755-767.
[157] Yoram Dinstein, 2010, p. 62.
[158] W.J. Fenrick, "New developments in the law concerning use of conventional weapons in armed conflict", **Canadian Yearbook of International Law**, Vol. 19, 1981, pp. 229-256.
[159] Ove Bring, "Regulating Conventional Weapons in the Future. Humanitarian Law or Arms Control?", **Journal of Peace Research**, Vol. 24, no. 3, Sep. 1987, pp. 275-286.

3.1.1.1. St. Petersburg Declaration and Hague Conventions

The first treaty was the St. Petersburg Declaration of 1868 in which the treaty banned the projectile of a weight below 400 grams, which is either explosive or charged with fulminating or inflammable substances between party states.[160]

The Hague Declaration of 1899 was inspired by the principles of the St. Petersburg Declaration. The second declaration that prohibited a specific weapon was concerned with expanding bullets in which parties agreed "to abstain from the use of bullets which expand or flatten easily in the human body, such as bullets with a hard envelope which does not entirely cover the core or is pierced with incisions."[161] Obviously, the declaration outlawed the use of so-called dum dum bullets used by the British Army against the India's tribesman and the US had planned to use them in the Philippines. The bullets were easily flattened on impact with human body and created superfluous injury.[162] Another crucial restriction about conventional weapons was the temporary prohibition on the launching of projectiles and explosives from balloons and other methods of similar nature for a period of five years. This restriction was abolished in 1905 by itself.[163] The Hague Convention of 1907's Protocol VIII regulated the use of automatic contact mines and included a provision as to the use of certain torpedoes.[164]

The St. Petersburg Declaration of 1868 and the Hague Convention IV of 1907 remained as the fundamental documents of international law concerning the use of conventional weapons in armed conflict until the 1970s. These documents formed a basis for the rule of prohibiting the infliction of unnecessary suffering upon combatants. However, the documents were insufficient in determining the limits of the rule prohibiting the use of weapons

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160 Christopher Greenwood, "The Law of Weaponry at the Start of the New Millennium", **International Law Studies**, Vol. 71, 1998, pp. 185-231.

161 W.J. Fenrick, p.252.

162 Ove Bring p. 276.

163 Christopher Greenwood, "The Law of Weaponry at the Start of the New Millennium", **International Law Studies**, Vol. 71, 1998, pp. 185-231.

164 William H. Boothby, **Conflict Law: The Influence of New Weapons Technology, Human Rights and Emerging Actors**, TMC Asser Press, The Hague, 2014, p. 166.

in certain circumstances where they will indiscriminately affect both combatants and non-combatants until the adoption of the Additional Protocol I in 1977.[165]

3.1.1.2. Conventional Weapons Convention (CCW)

The Additional Protocol I provided guidance for the upcoming conventions on the prohibition of certain weapons. *Christopher Greenwood* remarks that the Additional Protocol I emphasized that;

> *the principles that belligerents do not have an unlimited right to choose the methods and means of warfare and may not employ methods or means of warfare of a nature to cause unnecessary suffering, and also codifies important principles of customary international law regarding the protection of civilian life and property which have significant consequences for the freedom of States to select the methods and means of warfare.*[166]

The Weapons Conference was held in two sessions in Geneva from September 10 to 28, 1979, and from September 15 to October 10, 1980 to negotiate prohibitions of certain weapons, particularly incendiaries and small-caliber high-velocity small arms ammunition.[167] In consequence, the United Nations adopted the United Nations Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons of 1981 (CCW).[168] The first document was comprised of the original three Protocols on non-detectable fragments, mines and incendiary weapons. CCW has two more protocols on blinding laser weapons and explosive remnants or war. In addition to CCW protocols, the Ottawa Convention on Anti-Personnel Landmines and the Oslo Convention on Cluster Munitions also prohibited completely two specific weapons systems.[169]

Gary Solis emphasized that CCW was based on three cardinal principles of customary international law that weapons calculated to cause

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[165] W.J. Fenrick, p. 232.
[166] Christopher Greenwood, "The Law of Weaponry at the Start of the New Millennium", **International Law Studies**, Vol. 71, 1998, p. 188.
[167] W.J. Fenrick, p. 239.
[168] Christopher Greenwood, "The Law of Weaponry at the Start of the New Millennium", **International Law Studies**, Vol. 71, 1998, p. 189.
[169] Mariëlle Matthee, Brigit Toebes, Marcel Brus (Ed.), "**Armed Conflict and International Law: In Search of the Human Face**", TMC Asser Press, The Hague, 2013, pp. 268-269.

unnecessary suffering are prohibited, belligerents must always distinguish between civilians and combatants and the right of a belligerent to adopt means of warfare is not unlimited.[170] According to *Boothby*, the convention and its protocol are concerned with *jus in Bello* issues that is mentioned in the first paragraph of the preamble.[171]

3.1.1.2.1. Protocol I of CCW

Concerning The Protocol I of CCW, there was not any concrete evidence that the American forces used such weapons, which including fragments which in the human body escape detection by x-rays in Vietnam (US cluster bomb sub munitions). Moreover, none of the states participating in the Weapons Conference had such weapons in their inventory, the Protocol I was adopted by party states according to which "It is prohibited to use any weapon the primary effect of which is to injure by fragments which in the human body escape detection by x-rays."[172] Due to the worries of using such weapons, it is prohibited to use any weapon causing injury by no detectable plastic, wood fragments and glass bullets that could create difficulties for medical treatment and increase unnecessary suffering for which X-rays would be useless.[173]

3.1.1.2.2. The Protocol II of CCW

The Protocol II of CCW is the first legal multilateral arms control document appertaining to landmines. The Protocol II contains several important cruxes: initially, the protocol draws a frame for various landmines, booby traps, and other devices.[174] An anti-personnel landmine is "any

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170 Gary D. Solis, "**The Law of Armed Conflict: International Humanitarian Law in War**", Cambridge University Press, Cambridge, 2010, pp. 578-579.
171 William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 108.
172 W.J. Fenrick, p. 242.
173 Gary Solis, pp. 580-581.
174 Patrick M. Cottrell, "Legitimacy and Institutional Replacement: The Convention on Certain Conventional Weapons and the Emergence of the Mine Ban Treaty", **International Organization**, Vol. 63, no. 2, 2009, pp. 217-248.

munitions placed under, on or near the ground or other surface area and designed to be detonated or exploded by the presence, proximity or contact of a person or vehicle, and "remotely delivered mine" means any mine so defined delivered by artillery, rocket, mortar or similar means or dropped from an aircraft."[175] The use of Anti-personnel landmines (APLs) is prohibited in all circumstances, either in offence or defense, against the civilian population and is restricted to be used on remotely delivered (scatterable mines) APLs, and is authorized only "within an area which contains military objectives.[176] The Protocol II's Article 6 prohibits the use of certain types of booby traps. The Article 2 defines the term of "Booby-Trap" as such:

> *Booby-trap means any device or material which is designed constructed or adapted to kill or injure and which functions unexpectedly when a person disturbs or approaches an apparently harmless object or performs an apparently safe act."[177]*
> *"Other devices mean manually-emplaced munitions and devices designed to kill, injure or damage and which are actuated by remote control or automatically after a lapse of time.[178]*

W.J. Fenrick emphasized that the "Article 2 aimed at the practice of the Viet Cong in Vietnam of placing bamboo spikes covered with human excrement in concealed pits. The provision stated that "it is prohibited in all circumstances to use any booby-trap which is designed to cause superfluous injury or unnecessary suffering" (Article 6(2))."[179] Consequently, booby-trapping of the wounded body or dead body is prohibited. Moreover, booby-trapping children's toys or other objects specially designed for children's feeding, health, hygiene, clothing, or education are also banned. Even religious objects, historic monuments, places of worship or cultural objects should not be booby-trapped. In brief, the concept of prohibition of booby-trapping refers to an "apparently harmless portable object which is specifically designed and

[175] International Committee of the Red Cross (ICRC), CCW on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices, **Protocol II Article 1**, https://www.icrc.org/applic/ihl/ihl.nsf/ART/510-820002?OpenDocument, (23.03.2016).
[176] Patrick M. Cottrell, p. 230.
[177] CCW 1980 **Protocol II Article 2**
[178] CCW 1980 **Protocol II Article 3**
[179] W.J. Fenrick, p. 245.

constructed to contain explosive material and to detonate when it is disturbed or approached (Article 6(1)).”[180]

The CCW Protocol II opened for signature in 1980 and entered into force in 1983. However, CCW had some significant problems. Since, the Protocol II did not have any provisions in relation to regulating the production, sale, or possession of these weapons; it had limited perspective of the use of landmines.[181] After the painful experiences after a decade, the Protocol II was reviewed and amended on 3 May 1996. The outcome came with the Antipersonnel Mine Convention of 1997.

Prior to CCW, there was no definite regulatory provision as to the use of incendiary weapons. Although the use of incendiary weapons was extended back a long time, especially, incendiary weapons were being used during the Second World War. Subsequently, and increasingly, they were employed in the Korean and Vietnam wars. Some states considered the use of incendiary weapons against personnel to be illegal because of irritant effects by flame and because of the results of unnecessary suffering caused by burns based on the unnecessary suffering principle. Nonetheless, some states envisioned the use of incendiary weapons against military targets should be permissible by law.[182]

3.1.1.2.3. The Protocol III of CCW

First of all, the Protocol III’s Article 2(1) states that the use of incendiary weapons is prohibited in all circumstances to prevent civilian population as such, individual civilians or civilian objects from becoming the object of attack by incendiary weapons.[183] The Protocol III’s Article 2(2) prohibits the air-delivery of incendiary weapons against military targets located within a concentration of civilians. By contrast, with this provision, William Boothby explicated that according to the Article 2(3), if the military target is

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[180] Gary D. Solis, p. 582.
[181] Patrick M. Cottrell, p. 230.
[182] W.J. Fenrick, pp.247-248.
[183] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 78.

decisively distinguished from the concentration of civilians and all feasible precautions are taken to avoid loss of civilian life, injury to civilians and damage to civilian objects, non-air delivered incendiaries are permissible.[184] The fourth rule of the Protocol III prohibits attacks on forests or other kinds of plant cover except when these natural elements are used to conceal combatants or other military objectives or are themselves military objectives.[185]

The laser beams are used commonly for civil and military purposes such as health services, industry and shipping, range finding, target designation, and in different simulators for peacetime exercises.[186] A laser may also be used for temporary flash blinding towards military purposes, but the impact of a laser on the human eye hinges on factors such as electromagnetic frequency, power of the laser, its range, and atmospheric conditions. It is difficult to make the assessment whether the laser beam will cause permanent blinding or only flash blinding.[187] Consequently, the use of laser beams is dangerous for the human eye. Laser exposure may cause blindness. That is, to be exposed to the soldiers the continuous laser beam can blind to soldiers.[188]

3.1.1.2.4. The Protocol IV of CCW

The Protocol IV on the Blinding Laser Weapons was added to the Convention of 1980 in 1996. The Article 1 of the Protocol IV prohibits the use and transfer of laser weapons ‘specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to the unenhanced vision that is to the naked eye to the eye with corrective eyesight devices’.[189]

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184 William H. Boothby, **Conflict Law: The Influence of New Weapons Technology, Human Rights and Emerging Actors**, TMC Asser Press, The Hague, 2014, p. 164.
185 W.J. Fenrick, p.250.
186 Ove Bring p. 280.
187 Burrus M. Carnahan and Marjorie Robertson, “The Protocol on "Blinding Laser Weapons": A New Direction for International Humanitarian Law”, **The American Journal of International Law**, Vol. 90, no. 3, July 1996, pp. 484-490
188 Ove Bring, pp. 280-281.
189 Yoram Dinstein, **The Conduct of Hostilities under the Law of International Armed Conflict,** 2nd Edition, Cambridge University Press, Cambridge, 2010, p. 72.

The terms of "Specifically designed," as one of their combat functions and to cause "permanent blindness" to "unenhanced vision" are critical to understanding the scope of this prohibition. However, the use of lasers against electro-optical sights in combat, reflected in the Article 3, is not covered by the ban of this Protocol. Since the laser beam can destroy the device by overloading its electrical system, without harming the enemy operator.[190]

3.1.1.2.5. The Protocol V of CCW

The last Protocol V is related to Explosive Remnants of War (ERW). It is understood that the issue of explosive remnants of war has both widespread and long-term effects. According to mine actions and other programmers in collaboration with the UN have emphasized that in Afghanistan and Cambodia, more than half of the victims have been killed or injured by Unexploded Ordnance (UXO) such as hand grenades, mortars shells, fuses and cluster bombs. Moreover, in Bosnia and Herzegovina, around 30 percent of the victims are UXO casualties.[191] In 2000, the ICRC and a British NGO, Landmine Action came together to propose an item for the agenda of unexploded and abandoned landmines on the next CCW Review Conference.[192] One year later, A Group of Governmental Experts on Explosive Remnants of War, in order to examine the issues relating to ERW, hold a meeting under the title of the Review Conference of the UN Convention on Conventional Weapons of 1980 (CCW) in December 2001.[193]

After two years of debate, the Protocol V on Explosive Remnants of War was adopted on 28 November 2003 by forty-eight states. Briefly, the Protocol V applies to explosive remnants of war on the land territory including internal waters of Party States. The Protocol V not only applies to international armed conflict but also to non-international armed conflicts including fighting

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[190] Burrus M. Carnahan and Marjorie Robertson, p. 488.
[191] Laurence Desvignes, "**Explosive Remnants of War (ERW): Warnings and Risk Education**", Geneva International Centre for Humanitarian Demining, Geneva, 2003, p. 46.
[192] Gary D. Solis, p. 588.
[193] Laurence Desvignes, p. 7.

against colonial domination, alien occupation, and racist regimes. Subsequently, the Protocol gives general provisions and scope of application and makes definitions of Unexploded Ordnance (UXO) and ERW with the Article 1 and 2.[194]

The Protocol V is elaborated on clearance, destruction, recording and transmission of information of explosive remnants of war. Besides, other precautions for protection of the civilian population from the risks and effects of ERW are given in the Protocol. High Contracting Parties should protect humanitarian missions and organizations from the consequences of explosive remnants of war. However, Party States can take assistance with respect to existing explosive remnants of war from states non-party and international nongovernmental organizations (INGO's) and should provide support for marking and clearance, destruction and risk education to civilian populations about explosive remnants of war with the United Nations Organizations. Consequently, William Boothby emphasized that the adoption of the Protocol V put forward a crucial step concerning the hazards posed by explosive remnants. Because the Protocol V spells out party states and non-party states, all responsibilities should be related to ERW.[195]

Even if the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons (CCW) is an important step of conventional law, it does not satisfy the need for the prohibition of certain conventional weapons. Apart from CCW, the Mine-Ban Convention including total prohibition of anti-personnel mines (also known as the" Ottawa Treaty") was adopted in 1997.[196] Despite the Convention, in the following decade, many civilians suffered from the use of cluster munitions. Norway initiated the "Oslo Process" on cluster munitions in February 2007 for the development of new rules on cluster munitions in Oslo. In addition to the States, the UN Agencies, the civil society agencies (Cluster Munitions Coalition and the ICRC) which

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[194] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, p. 301-313.
[195] William H. Boothby, 2009, pp. 302-313.
[196] ICRC, **Anti-Personnel Mine Ban Convention,** 18 September 1997. https://www.icrc.org/applic/ihl/ihl.nsf/Treaty.xsp?documentId=B587BB399470269441256585003BA277&action=openDocument, (27.03.2016).

participated in the Diplomatic Conference as observers, 108 States signed the Convention on 3 December 2008 and 31 July 2010. The Convention entered into force on 1 August 2010.[197] The circumstances of cluster munitions will be examined in the next section in detail.

As it is seen above, each particular conventional weapon has been elaborated on their specific circumstances. However, some initiatives have been carried out by some societies (especially ICRC) concerning of depleted uranium munitions, armed drones and cyber-attack robots. I will scrutinize the details of conventional and mass destruction weapons based on the law of weaponry. Meanwhile, I will also present the situations of current non-binding law weapons system, and in the future, they have the most potential to be regulated in the law of weaponry.

3.1.2. Certain Conventional Weapons

3.1.2.1. Cluster Munitions

William Boothby defines Cluster Munitions based on USAF Manuals in following terms:

> *Cluster bombs, or CBUs, are used to attack area targets such as concentrations of military personnel, vehicles or armor. Among other things, the use of cluster munitions reduces the risks to aircrews and equipment by reducing the number of sorties required to effectively attack such military objectives. A CBU munitions (sic) consists of a canister-type dispenser containing submunitions, or bomblets, that disperse in the air after the dispenser opens. The bomblets, in general, arm after dispersal and detonate upon impact…. One dispenser of bomblets may cover an oblong or rectangular area on the ground measuring several hundred feet in length. The dispersal pattern is determined by the type of CBU, the dispenser spin rate (if the particular CBU uses spin to dispense the bomblets), and release parameters.*[198]

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[197] ICRC, **Convention on Cluster Munitions**, 30 May 2008. https://www.icrc.org/applic/ihl/ihl.nsf/Treaty.xsp?documentId=00E3441C08D5B5B9C12574C6002EE0D3&action=openDocument, (27.03.2016).

[198] William H Boothby, "Cluster Bombs: Is There a Case for New Law?", **Program on Humanitarian Policy and Conflict Research, Harvard University,** Cambridge, no. 5, 2005, p. 4.

In brief, cluster munitions are large weapons that spread dozens or hundreds of smaller munitions, called sub munitions, over a wide area.[199] These submunitions including bomblets, grenades or mines are ejected from the cluster and scattered over a wide area. Similar to land mines, these submunitions have the high potential to become unexploded ordnance or explosive remnants of war for years after the armed conflict.[200]

There are four main categories of sub munition, anti-personnel, anti-tank/anti-materiel, combined-effects munition (CEM), and landmines. These may be pressure or trip wire initiated, may include self-destruct mechanisms, and are deployed primarily in an area-denial role.[201]

Especially two types of submunitions have been the most prominent instances for the conflicts in the last decade. The first is the air-dropped CBU-87 (CEM)[202] which contains 202 BLU-97[203] submunitions. BLU-97 submunitions were used extensively in the air campaigns in the Gulf War, Kosovo Operation, Afghanistan and the Iraq Invasion. The second example of submunitions is the air-dropped cluster CBU-58/B (anti-personnel) which contains 650 the BLU- 63[204] submunitions. Intensively, the Israeli Air Force dropped them in the Southern Lebanon in 2006. These are brown-green, baseball-sized bomblets, which are primarily used as anti-personnel weapons.[205]

From a historical perspective, Cluster munitions are being used since the Second World War. Initially, Germany was the first country to drop AB-250 series cluster munitions that contained SB-2 bomblets known as the

[199] Bonnie Docherty, “Breaking New Ground: The Convention on Cluster Munitions and the Evolution of International Humanitarian Law”, **Human Rights Quarterly**, Vol. 31, no. 4 (Nov., 2009), pp. 934-963.
[200] Michael Ray. “Convention on Cluster Munitions”, **Encyclopedia Britannica**, (September 2014), Research Starters.
[201] Rae McGrath, “**Cluster Bombs: The Military Effectiveness and Impact on Civilians of Cluster Munitions. London”**, UK Working Group on Landmines, London, 2000, p. 64.
[202] The **CBU-87** is a cluster bomb used by the USAF and Allied Air Forces.
[203] **The BLU-97** yellow, soda can-sized bomblets have a triple anti-armor, anti-personnel, and incendiary effect when detonated.
[204] The **BLU-63**/B is an American antipersonnel, high-explosive submunition.
[205] Bonnie Docherty. “The Time is Now: A Historical Argument for a Cluster Munitions Convention.” **Harvard Human Rights Journal**, Spring 2007, pp. 53-87.

‘butterfly bomb’ during air raids on the United Kingdom.[206] After the Second World War, cluster munitions were used extensively in the Southeast Asia by the United States in the Vietnam War. According to ICRC, in Laos, 9 million to 27 million unexploded submunitions remained after the conflict, and they caused over 10,000 casualties to date. Furthermore, Cluster munitions were used by the Soviets in Afghanistan, by the British in the Falklands, by the Coalition in the Gulf War, and in Yugoslavia.[207] In Yugoslavia, NATO-dropped cluster bombs killed between 90 and 150 civilians.[208] During the 2006 Israel–Hezbollah War, the cluster munitions were used intensively. During a five-week conflict, according to the UN estimates, Israel dropped four million submunitions on the South Lebanon. One million of these submunitions were unexploded. These unexploded submunitions killed or injured more than 150 civilians in the first six months after the end of the conflict.[209]

Cluster Munitions are designed to spread over an extended area, troubles of cluster munition submunitions cover a wide area, affecting the life of many civilians.[210] Particularly, they mostly fail to detonate and are difficult to detect, and their submunitions can remain as explosive hazards for decades. These munitions primarily cause civilian casualties.[211] For example, according to the manufacturer of CBU-87, the dud rate of one of the more widely used antipersonnel CBUs, the CBU-87, is about five percent. *Gary Solis* expressed that by contrast, some field reports make remarks that the rate to be up to twenty-three percent. These unexploded submunitions presented obvious

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[206] Nout van Woudenberg, "The Long and Winding Road Towards an Instrument on Cluster Munitions." **Journal of Conflict and Security Law**, Vol. 12, no. 3, 2008, pp. 447-483.
[207] Andrew Feickert and Paul K. Kerr, **“Cluster Munitions Background and Issues for Congress”,** Congressional Research Service, Library of Congress, Washington, D.C., 2012, p. 12.
[208] Bonnie Docherty, p. 53.
[209] Bonnie Docherty, “Breaking New Ground: The Convention on Cluster Munitions and the Evolution of International Humanitarian Law”, **Human Rights Quarterly**, Vol. 31, no. 4 (Nov., 2009), pp. 939.
[210] Mika Hayashi, The Convention on Cluster Munitions and the Clearance of Cluster Munitions Remnants: Whose Responsibility, and How to Ensure Effective Implementation?, **International Humanitarian Legal Studies,** Vol. 3, no. 2, 2012, pp. 322-343.
[211] Andrew Feickert and Paul K. Kerr, **“Cluster Munitions Background and Issues for Congress”,** Congressional Research Service, Library of Congress, Washington, D.C., 2012, p. 12.

problems of distinction and proportionality. Hundreds of civilians were killed or wounded for years after the conflicts.[212]

Except for the failure rate of submunitions, lack of a self-destruct capability is another important factor. In event of a lack of self-destruct capability, submunitions can remain a hazard for civilians for decades. However, self-destruct features cannot eliminate unexploded ordnance problems caused by cluster munitions. Some factors influence submunition reliability. Additionally, other factors can also cause the failure of detonation such as delivery technique, age of the submunition, air temperature, landing in soft or muddy ground, getting caught in trees and vegetation, and submunitions being damaged after dispersal, or landing in such a manner that their impact fuses fail to initiate.[213]

In contrast to negative approaches towards cluster munitions, *William H. Boothby* emphasized that cluster munitions are militarily effective against soft-skinned vehicles, accumulations of troops and armored vehicles in a wide or dispersed area.[214] The United States has opposed to the CCW Convention. There are three main reasons of opposition of the United States. The first is related to the concern that the world leading manufacturers of cluster munitions such as Brazil, China, India, Israel, Pakistan, and Russia have not ratified the Convention of CCW. The second reason is related to the military advantages of the cluster munitions in which they can cause less collateral damage than unitary weapons such as a larger bomb or larger artillery. Therefore, accordingly, the prohibition of cluster munitions may cause the loss of lives of the US and allied service members. Finally, on 19 June 2008, the US Department of Defense issued a significant policy of eliminating the use of cluster munitions, if the cluster munitions have a greater ratio of unexploded than one percent, these cluster munitions will be demolished by 2018. Moreover, the policy also prohibited the export, sale or transfer of cluster

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[212] Gary D. Solis, p. 591.
[213] Andrew Feickert and Paul K. Kerr, p. 2.
[214] William H. Boothby, 2009, p. 254-255.

munitions not meeting the one percent standard.[215] The United States believes that if cluster munitions are equipped with self-destruct system and with a low submunitions failure rate, they are not unlawful than artillery or high explosive bombs.[216]

The planners and executors of Air Forces should consider the information mentioned above. Prior to engagement of the target, cluster munitions must be planned for military objectives that are far away from residential areas. Moreover, concerning with the cluster munitions, I think the US attitude is correct to decrease of the ratio of the UXO. Therefore, other producer states of cluster munitions should follow the similar way.

3.1.2.2. Incendiaries

Incendiary weapons are designed to produce high heat and intense fire to cause burning of combatants and military equipment through the chemical reaction of inflammable. Moreover, sole incendiaries are also produced to use of smokescreens or provide illumination.[217] The initial examples of rudimental incendiary weapons were used by ancient civilizations formerly known as Greek fire since the 9th Century BC. Especially, incendiary weapons were used by belligerents during the World War I and later intensively during the Second World War by Germany, the United States, and the United Kingdom.[218] In Japan, the United States of Air Force dropped around 100.000 tons of incendiary bombs on 60 Japanese cities. As a result of air campaigns, over 260.000 people were killed and 412.000 people were injured. At the same time,

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215 Matthew E. Dunham, “The Fate of Cluster Munitions”, **The Reporter**, Vol. 37, no. 1, 2010, pp. 26-30.
216 Gary D. Solis, p. 593.
217 "Incendiary Weapons: Recent Use and Growing Opposition.", **Human Rights Watch**, 2014. https://www.hrw.org/news/2014/11/10/incendiary-weapons-recent-use-and-growing-opposition, (12.04.2016).
218 William H. Boothby, 2009, pp. 199-200.

because of Allied air raids on the Hamburg, in the summer of 1943, over 43.000 people were killed by incendiary weapons.[219]

Increasingly, napalm weapons have begun to be used by aircrafts against tactical targets located close to or within the conflict zone since 1943. The most important reason for the use of napalm and other incendiaries by aircrafts is that particularly when close air support is necessary, napalm bombs can be delivered with greater accuracy than alternative weapons such as artillery. In such cases, allied troops were able to shelter themselves against incendiaries, and dropped close to their positions, when the napalm bombs hit the enemy forces.[220] During the Vietnam War, the United States frequently used napalm bombs.[221] In emergencies, the American commanders called for napalm strikes extremely close to their own positions. However, the American troops were relatively less affected by the napalm bombs.[222]

Above all, one of the breaking points of Vietnam War was the "napalm girl" incident. Nine-year-old Phan Thi Kim Phuc was photographed by the AP photographer Nick Ut on June 8, 1972. She ripped her clothes off her because they were burning. Phan Thi Kim Phuc was exposed to the fire of napalm bomb.[223] After this occasion, American public opinion developed a tendency to be against the war in Vietnam. American Citizens thought that the United States had made a mistake by sending troops to fight in Vietnam. The antiwar tendency resulted in powerful and decisive effects on the alteration of the United States policy.[224] For the first time, the indiscriminate use of a certain weapon system caused the change of a state's foreign policy.

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219 International Committee of Red Cross (ICRC), "**Weapons That May Cause Unnecessary Suffering or Have Indiscriminate Effects**", Report on the Work of Experts, Geneva, 1973, pp. 60-61.
220 W.J. Fenrick, "New developments in the law concerning use of conventional weapons in armed conflict", **Canadian Yearbook of International Law**, Vol. 19, 1981, p. 247.
221 William H. Boothby, 2009, p. 200.
222 W.J. Fenrick, p. 247.
223 Angie Lovelace, "Iconic Photos of the Vietnam War Era: A Semiotic Analysis as a means of understanding", **The Elon Journal of Undergraduate Research in Communications**, Vol. 1, no. 1, Winter 2010, pp. 35-45.
224 W. Joseph Campbell, "Picture Power? Confronting the Myths of 'Napalm Girl'", **American Journalism Historians Association**, 34th Annual AJHA Convention, Oklahoma City, October 2015.

During the Bosnian War, Serb guerrillas used incendiary and napalm bombs against the Bosnian cities. Even Serb forces dropped napalm in the United Nations-declared safe areas according to the UN Observer reports.[225] Another example was that during Israel's "Operation Cast Lead" in Gaza in the winter of 2008-9, Human Rights Watch accused Israel for using the white phosphorus shells to cause civilian deaths.[226] According to Human Rights Watch (HRW), the use of white phosphorus in civilian populated areas of Gaza infringed on LOAC. On the contrary, Israel should have taken all precautions to avoid civilian injury and loss of life.[227] However, by virtue of the international criticism of its former application in Gaza, Israel changed its policy and avoided the use of white phosphorus munitions during the 2014 military operations in Gaza.[228]

Figure 1: Israeli white phosphorus attack on the Gaza Strip

Source: Agence France-Press-AFP, "**Israel phosphorus use criticized**", BBC News, http://news.bbc.co.uk/2/hi/middle_east/7964057.stm, (19.04.2016)

[225] Leslie C. Green, "**The contemporary law of armed conflict**", Manchester University Press, Manchester, 2000, p. 141.
[226] BBC, "**Israel phosphorus use criticized**", BBC News, http://news.bbc.co.uk/2/hi/middle_east/7964057.stm, (19.04.2016).
[227] Jeremy R. Hammond, "Israel's Illegal Use of White Phosphorus during 'Operation Cast Lead' And How the US Media Tries to Cover Up Israeli War Crimes", **Foreign Policy Journal**, May 3, 2013. http://www.foreignpolicyjournal.com/2013/05/03/israels-illegal-use-of-white-phosphorus-during-operation-cast-lead/, (19.04.2016).
[228] Memorandum to Convention on Conventional Weapons Delegates, "Incendiary Weapons: Recent Use and Growing Opposition", **Human Rights Watch,** 2014. https://www.hrw.org/news/2014/11/10/incendiary-weapons-recent-use-and-growing-opposition, (19.04.2016).

During the Syrian Civil War, according to Human Rights Watch, the Syrian regime forces have used incendiary weapons over the past four years. From November 2012 to the present, at least 57 strikes by the Syrian government carried out attacks using incendiary weapons. For example, on August 26, 2013, the Syrian regime forces dropped two incendiary bombs on a school in northern Aleppo governorate. As result of the strike, at least 37 civilians were killed and 44 were wounded, mostly teenagers.[229]

With relation to the effects on human body, the incendiaries burn and damage the layers of the skin or underlying tissues. The treatment is difficult, prolonged and painful. If the ambustion covers more than 15% of the body surface, the expectation of life of the patient can decline because of severe and fatal metabolic changes. With respect to napalm, besides burning effects, because of its consumption of huge quantities of oxygen and its generation of substantial amounts of carbon monoxide, people can expose to fatal effects in the vicinity of the fire. Likewise, white phosphorus causes deep burns due to the fact that it spreads in small adhesive lumps. As long as, the white phosphorus particles remain unextinguished, damages to muscles and other deep tissues would be continued.[230]

The U.N. Certain Conventional Weapons Convention of 1980's Protocol III Article 1 prohibits the use of the incendiary weapon against all circumstances to protect the civilian population as such, individual civilians or civilian objects.[231] CCW forbids attacks on military objectives that are close to civilians by air-delivered incendiary weapons.[232] This prohibition is derived from the common attacks on the cities during the Second World War.[233] However, if the military objective is decisively separated from civilians and if

[229] Human Rights Watch (HRW), "**Incendiary Weapons: Recent Use and Growing Opposition",** Memorandum to Convention on Conventional Weapons Delegates

[230] International Committee of Red Cross (ICRC), 1973, pp. 61-63.

[231] International Committee of the Red Cross (ICRC), CCW on Restrictions on the Use Incendiary Weapons, **Protocol III Article 1**, https://www.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=14FEADAF9AF35FA9C12563CD0051EF1E, (24.04.2016).

[232] William H. Boothby, 2014, p. 164.

[233] Gary D. Solis, p. 585.

all precautions are taken to limit the incendiary effects to avoid or minimize loss of civilian life and injury to civilian population, attacks on military targets by non-air delivered incendiaries is allowable.[234] Moreover, CCW prohibits attacks on plant cover, such as forests by incendiary weapons except in the case of the plant cover that is used to conceal combatants.[235] The Protocol III had little impact on the limitations of the incendiary weapons.[236]

3.1.2.3. Blinding Laser Weapons

Laser weapons can be used against enemy combatants to both kill or injure them. However, laser systems are used in a variety of military applications including range finding, target designation, jamming, dazzling, communications, and weapons guidance. These applications do not violate the Law of Armed Conflict (LOAC), even if they cause serious eye injury or permanent blindness by accident.[237] Human-rights groups have been concerned about the possibility of utilization of laser-based weapons that cause permanent blindness of combatants for years.[238] Due to its nature, a laser beam can be aimed directly against specific targets, so laser weapons are not indiscriminate. For this reason, laser weapons can cause permanent loss of vision, and exposed combatants may have severe life-long incapacitations. Such circumstances are evaluated under the customary principles of ‘superfluous injury or unnecessary suffering’. On the other hand, laser weapons, which cause temporary flash blinding of enemy personnel, do not breach the law of weaponry; they are feasible for military purposes such as riot controls.[239]

Prior to the negotiation of the Protocol IV to the Convention on Certain Conventional Weapons, the blinding laser weapons had been developed by a

[234] William H. Boothby, 2014, p. 164.
[235] Gary Solis, p. 586.
[236] Christopher Greenwood, Current Issues in the Law of Armed Conflict: Weapons, Targets and International Criminal Liability, **Singapore Journal of International & Comparative Law**, no. 1, 1997, p. 445.
[237] General Counsel of the Department of Defense, “**Law of War Manual**”, General Counsel of the Department of Defense, Washington, DC, 2015, p. 387.
[238] Gary Solis, p. 586.
[239] Yoram Dinstein, 2004, p. 73.

number of countries. According to Human Rights Watch, China, France, Germany, Israel, Russia, Ukraine, the United Kingdom and the United States had such programmed.[240] Although these countries had produced some examples of blinding laser weapons, they could not be used on any battlefield.[241]

The Protocol IV to the Weapons Convention reflects these concerns. The Article 1 prohibits the utilization of "laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision that is to the naked eye or to the eye with corrective eyesight devices". As mentioned above, laser weapons which are designed for range finding, target designation or dazzling are not prohibited by the protocol because their purpose of basic design does not include permanent blindness of combatants. The Article 2 of the Protocol confers the responsibilities of the party states "to take all feasible precautions, to avoid the incidence of permanent blindness to unenhanced vision."[242]

For instance, one of the areas of applications of laser weapons is "dazzling laser system" which does not cause permanent blindness. The dazzle system is a green laser device that delivers a limited amount of force, at a distance, without causing injury. The dazzle" system is employed to confuse individuals or groups of enemy combatants, and drivers of vehicles approaching checkpoints, by glare or flash blindness. In compliance with CCW of 1980, dazzler laser system can be employed by applicable LOAC treaties.[243]

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240 Jean-Marie Henckaerts, Louise Doswald-Beck, and Carolin Alvermann, "**Customary International Humanitarian Law**", Cambridge, Cambridge University Press, 2005, p. 293.
241 William H. Boothby, 2009, p. 209.
242 Christopher Greenwood, "Law of Weaponry at the Start of the New Millennium", **International Law Studies Series**, US Naval War College, Vol. 71, 1998. p. 208.
243 Gary D. Solis, pp. 587-588.

3.2 WEAPONS OF MASS DESTRUCTION

3.2.1 Chemical Weapons

Chemical Warfare Agents are the deadliest type of Weapons of Mass Destruction (WMD), created by humankind. Chemical warfare agents are enormously toxic chemical agents. They can be forms of gas, liquid or aerosol. Chemical Warfare Agents can be lethal or incapacitating effects on humans.[244] The North Atlantic Treaty Organization defines a chemical agent as "a chemical substance which is intended for use in military operations to kill, seriously injure or incapacitate people because of its physiological effects."[245]

Chemical Warfare Agents have different characteristic. They can be classified according to their volatility, persistency, and having organophosphorus (OP), organosulfur, organ fluorine compounds and arsenicals. In general, the CW agents are classified by their physiological effects on humans. Nerve, Blood and Choking Agents are lethal chemical compounds. Vesicants or Blister Agents have a characteristic of irritancy on humans. However, riot-control (tear gases), incapacitating agents and some toxins are also evaluated as Chemical Warfare Agents.[246] Most lethal Chemical Warfare Agents are nerve agents. Most of the nerve agents were developed prior to the Second World War. The nerve agents have been used by Iraq against the Iranian soldiers and against Kurdish civilians. A terrorist group struck Tokyo subway in Japan. Because of accidental release of VX[247] in a remote area of the United States, 6,300 sheep were exposed and 4,500 were directly killed by the nerve agent. As reported, a worker in a nerve agent-contaminated area was accidently exposed to GB[248] (soman) nerve agent because of his gas mask cracked. He began to complain of difficulty in

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[244] K. Ganesan, S. K. Raza, and R. Vijayaraghavan, "Chemical warfare agents", **Journal of Pharmacy & Bioallied Sciences,** Vol. 2, no. 3, 2010, pp. 166-178.
[245] North Atlantic Treaty Organization, "**Handbook on the Medical Aspects of NBC Defensive Operations"**, Brussels: NATO, 1996. (AMedP-6 (B).)
[246] K. Ganesan, S. K. Raza, and R. Vijayaraghavan, pp. 166-178**.**
[247] **VX** is high kill death ratio, most dangerous persistent Nerve Chemical Warfare Agent.
[248] GB is the one of the nonpermanent Nerve Chemical Warfare Agent.

breathing, and respiratory distress with copious secretions. After the 5-10 min of his first symptoms, he was cyanotic and convulsing. He had myoclonus, miosis, salivation, and rhinorrhea. After the recovery, the worker experienced a prolonged period of mental depression. Approximately 18 months after exposure, he died from a heart attack caused by severe coronary artery disease.[249]

Another commonly used Chemical Agent is Mustard agent. It immediately irritates the respiratory system and damages skin and eyes. Some symptoms such as skin blisters and corneal effects become apparent in minutes or up to hours. Mustard agents cause carcinogenic effects within 2-4 minutes, for which there are no antidotes. Moreover, Mustard Agents cause long-term effects including cancer; damage to respiratory, immune, and reproductive systems and blindness.[250] Undoubtedly such chemical agents violate the core principles of humanitarian customary law since they result in superfluous injury, unnecessary and indiscriminate suffering.

In the historical context, Chemical warfare agents were first used extensively during the First World War. Because chemical weapons are cheap and relatively easy to produce, they can cause mass casualties. They have been used in many conflicts as well as in terrorist attacks during the 20th century.[251] Fritz Haber was (also considered the "father of chemical warfare") a German scientist who proposed using chlorine gas on the Allied troops. After the initial successful advances, the German Army's attacks were stopped by the Allied Forces. The Allied and Central Powers were in the mire of muddy trench warfare. According to the recommendation of Fritz Haber, the German Staff decided that using chemical weapons could help and impasse the trench warfare.[252] Thus, for the first time, the German gas attack was carried out

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[249] Sharon Reutter, "Hazards of Chemical Weapons Release during War: New Perspectives", **Environmental Health Perspectives**, Vol. 107, no. 12, 1999, pp. 985-990.

[250] Christine Gosden and Derek Gardener, "Abc of Conflict and Disaster: Weapons of Mass Destruction: Threats and Responses", **BMJ: British Medical Journal**, Vol. 331, no. 7513, 2005, pp. 397-400.

[251] Evison Demetrius, Hinsley David, Rice Paul, "Chemical Weapons***",* British Medical Journal (BMJ)**, Vol. 324, September 2002, pp. 324-332.

[252] Sarah Everts, "When Chemicals Became Weapons of War", **Chemical & Engineering News Archive**, Vol. 93, no. 8, 2015, pp. 8-21.

against enemy with chlorine on 22 April 1915 at Ypres, Belgium.[253] After the chemical gas attack on April 22, 1915, in the Second Battle of Ypres, the British and French armies decided to produce chemical warfare agents through formed chemical companies. Chemical gas warfare were launched by the both sides. At the 1915 battle of Loos, Belgium, the British forces attacked the German lines with chlorine gas. Besides of chlorine gas, phosgene and mustard gases were also employed in the battlefields. By the end of the war, chemical warfare caused approximately 1,000,000 casualties and estimated 90,000 deaths. Many survivors of chemicals were left blinded or chronically disabled.[254]

After the Great War, Chemical Weapons have been used several times throughout the 20th century. When Italy invaded Ethiopia in 1935, Italy used mustard gas delivered via aircraft spraying. Moreover, while Japan invaded China in 1936, Japan Imperial Forces carried out chemical attacks against insurgents (including mustard gas, phosgene, and hydrogen cyanide). In between years of 1963 and 1967, Egypt used phosgene and mustard chemical bombs via aerial delivery during the Yemeni civil war. Iraq attacked the Iranian Forces several times with chemical weapons between 1980 and 1988. Furthermore, Iraq launched air chemical strikes on the Kurdish civilian population of Halabja (killing around 5,000 people) using mustard and nerve agents on 16 March 1988.[255]

In June of 1994, a terrorist group carried out chemical attack with nerve agent against civilian population in Matsumoto, Japan. As a result of the strike, seven people were killed and 600 were wounded. On 20 March 1995, the same terrorist group dispersed liquid nerve agent in the Tokyo subway. Twelve people were killed and more than 5,000 exposed patients needed urgent medical attention. If the nerve agent was correctly dispersed, the number and

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doi:10.1021/cen-09308-cover1.

[253] K. Ganesan, S. K. Raza, and R. Vijayaraghavan, "Chemical warfare agents", **Journal of Pharmacy & Bioallied Sciences,** Vol. 2, no. 3, 2010, pp. 166-178

[254] Solis, pp. 600-01.

[255] Evison Demetrius, Hinsley David, Rice Paul, "Chemical Weapons**", British Medical Journal (BMJ)**, Vol. 324, September 2002, pp. 324-332.

severity of casualties would have been significantly higher.[256] Finally, the Syrian government carried out a chemical weapon attack in the suburbs of Damascus, in Eastern and Western Ghouta, on August 21, 2013. The Syrian Regime used a nerve agent in the attack. According to the assessments of the US Government, 1,429 people were killed in the chemical weapons attack, including at least 426 children.[257]

Figure 2: Bodies of victims of a suspected chemical attack on Ghouta

Source: 2013 AP Photo/Shaam News Network, **Bodies of victims of a suspected chemical attack on Ghouta**, Syria on Wednesday, August 21, 2013. Humans Rights Watch. https://www.hrw.org/sites/default/files/styles/marquee/public/multimedia_images_2015/syria0913_coverimage1.jpg?itok=1Y0rxUXO, (01.05.2016).

The first known prohibition of the use of poisons and poisoned weapons during armed conflict is the Hindu Laws of Manu, which was introduced in the first century, BC.[258] The first international agreement related to the prohibition of poisonous weapons is the Strasbourg Agreement of 1675, signed by France and Germany. The Article 57 of the Agreement prohibited the use of poisoned bullets during the war. Another crucial historical document was the Lieber Code, which contained provisions in relation to prohibition of

[256] Sharon Reutter, “Hazards of Chemical Weapons Release during War: New Perspectives”, **Environmental Health Perspectives**, Vol. 107, no. 12, 1999, p. 988.

[257] "Government Assessment of the Syrian Government's Use of Chemical Weapons on August 21, 2013." **The White House, Office of the Press Secretary**, 30.08.2013. https://www.whitehouse.gov/the-press-office/2013/08/30/government-assessment-syrian-government-s-use-chemical-weapons-august-21, (01.05.2016).

[258] William H. Boothby, 2009, p. 118.

the use of poison in warfare.[259] After about two hundred years from the Strasbourg Agreement, the Brussels Convention of 1874 prohibited the employment of poisons or poisoned weapons, and the use of arms, projectiles or materiel to cause unnecessary suffering during an international war.[260] The next important document is the Hague Declaration of 1899 which was the first international treaty concerning the prohibition of asphyxiating gases' use in projectiles, the sole object of which is the diffusion of asphyxiating or deleterious gases. However, chemical warfare agents were used frequently during the World War I.[261]

The Council of the League of Nations convened a conference in 1925. Although the subject of meeting was the Supervision of the International Trade in Arms and Ammunition and Implements of War, use of asphyxiating and other gases during the First World War was also on the agenda. As a result, the Geneva Protocol of 1925, which is one of the most important international agreements on the subject, was adopted by the League of Nations.[262] This protocol banned the use of asphyxiating (choking agents), poisonous or other gases (mustard and chlorine agents), and of analogous liquids, materials or devices.[263] According to *Solis,* the Geneva Gas Protocol of 1925 is an arms control agreement, rather than a document of the law of war. Due to its many reservations, the protocol is limited with the prohibition of chemical and biological methods of warfare.[264]

Even though the Protocol forbids the use of certain chemical weapons, it does not cover the prohibition of acquisition, development, production, or stockpiling of poisonous gas or bacteriological agents. As mentioned above, the Protocol is not very comprehensive. Given the historical incidents, we know that chemical warfare agents are responsible for the deaths of numerous

[259] Jefferson, p. 648.
[260] The Organization for the Prohibition of Chemical Weapons (OPCW), "Genesis and Historical Development", **Chemical Weapons Convention**. https://www.opcw.org/chemical-weapons-convention/genesis-and-historical-development/, (04.05.2016).
[261] Yoram Dinstein, 2004, p. 73.
[262] Gary D. Solis, pp. 601-02.
[263] Green, p. 135.
[264] Gary D. Solis, pp. 601-02.

civilians and combatants. With the Chemical Weapon Convention (CWC) of 1993, chemical weapons were banned all together.[265]

The CWC is much more comprehensive concerning prohibiting chemical weapons than the previous Geneva Gas Protocol of 1925. According to the first crux of the convention, the use of chemical weapons shall not be violated by Party States under any circumstances.[266] The other significant point is that CWC forbids using, developing, producing, otherwise acquiring, stockpiling or retaining chemical weapons or transferring chemical weapons directly or indirectly, to anyone. Furthermore, military preparations or operations associated with using such weapons and assisting, encouraging or inducing anyone to do anything prohibited to a state party to the Convention are prohibited.[267] Besides, the party states are undertaken to destroy chemical weapons they own or possess and further destroy any chemical weapons production facilities they own or possess.[268]

Although the Chemical Weapons Convention of 1993 prohibits the use of non-lethal Riot Control Agent (RCA) as a weapon of war, the same Convention does not forbid the use of RCAs in law enforcement and riot controls.[269] *Gary Solis* evaluates in this circumstance, riot control agents and CS gas[270] can be used in both law enforcement and non-international armed conflicts.[271]

Finally, one of the particular features of CWC is that the Organization for the Prohibition of Chemical Weapons (OPCW) was established by the Article VIII of the Convention. The head office of the organization is located in the Hague. The Organization's Executive Council is formed of forty-one representatives elected from the state parties.[272] The primary function of the

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[265] William H. Boothby, 2009, pp. 129-30.
[266] Yoram Dinstein, 2004, p. 75.
[267] William H. Boothby, 2014, p. 165.
[268] ADDP 06.4, p. 1-11.
[269] Stephen Coleman, "Ethical Challenges of New Military Technologies", **The New Technologies and The Law of Armed Conflict**, Ed. Nitoshi Natu and Robert McLaughhlin, Asser Press, The Hague, 2014, p. 35.
[270] **CS** is a white solid powder tear gas used by law enforcement.
[271] Gary. D. Solis, pp. 610-11.
[272] Gary D. Solis, p. 613.

Organization is to ensure the implementation of the provisions established in CWC. OPCW supports state parties in the process of demilitarization of chemical weapons through technical and consultancy service. OPCW has also the responsibility to inspect non-proliferation of chemical weapons. According to the Convention, if any circumstances of any state party that is attacked or is threatened with chemical weapons, states parties give and offer assistance and support through OPCW.[273]

3.2.2 Biological Weapons

According to the description of the United Nations Office at Geneva (UNOG), biological weapons are “disease-causing organisms or toxins to harm or kill humans, animals or plants delivered” by weapons or mechanical dissemination systems. Biological weapons have wide range of military applications because of their advantages. Moreover, biological weapons can be used for “political assassinations, the infection of livestock or agricultural produce to cause food shortages and economic loss, the creation of environmental catastrophes, and the introduction of widespread illness, fear and mistrust among the public.”[274]

The pathogens were used many times as biological weapons in history. For instance, Mongols used plague at the Battle of Kafka. During the French and Indian War, the British used smallpox against the Delaware Indians.[275] In 1917, Germans used anthrax to interfere supply-lines against the horses and reindeers of the Allied Forces.[276]

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273 The Organization for the Prohibition of Chemical Weapons (OPCW), “The work of Organization for the Prohibition of Chemical Weapons”, **OPCW**. https://www.opcw.org/our-work/, (04.05.2016).
274 The United Nations Office at Geneva-UNOG." What Are Biological and Toxin Weapons?”, **The Biological Weapons Convention.** http://www.unog.ch/80256EE600585943/(httpPages)/29B727532FECBE96C12571860035A6DB, (04.05.2016).
275 Jim A. Davis, “The Looming Biological Warfare Strom”, **Air & Space Power Journal**, Vol. 17, no. 1, Spring 2003, pp. 57-67.
276 Leslie, p. 137.

The Japanese used 16 different BW agents (typhoid, plague, anthrax, etc.) on Russian and Chinese forces and citizens, in World War II.[277] Japan General Shiro Ishii carried out biological experiments on the Chinese prisoners. In 1939, that the Japanese Imperial Army used biological warfare agents against Russia by means of poison animals with anthrax and other diseases. General Ishii developed and produced over 1,600 biological bombs. For example, one of the most efficient biological bombs was 25-kg Type 50 UJI bomb, also filled with anthrax spores.[278] In 1984, the Bhagwan Shree Rajneesh sect carried out a biological attack, disseminated salmonella spores on the restaurant salad bars in Oregon, and 750 civilians were exposed to contamination. In 2001, the letters filled with anthrax spores were mailed to the Democratic US Senators and other US government offices. This biological attack caused the death of five people.[279]

Initially, the prohibition concerning bacteriological and biological weapons was evaluated as a secondary issue in the Gas Protocol of 1925. According to the terms of the declaration, the High Contracting Parties accepted to prohibit 'the use of bacteriological methods of warfare and agree to be bound as between themselves'.[280] In 1960s, the United Nations and World Health Organization reported on the potential dangers of chemical and biological warfare. According to the reports, these weapons had been more dangerous in their extraordinary threats to both civilians and combatants. In the late 1960s, the UN Committee on Disarmament decided to concentrate only on the issue of the prohibition of biological weapons.[281] The UN General Assembly was convened in 1971 to draw up a Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction.[282] The Biological Weapons

[277] Davis, p. 58.
[278] Frederick R. Sidell, Ernest T. Takafuji, and David R. Franz, "**Medical Aspects of Chemical and Biological Warfare**", Borden Institute, Walter Reed Army Medical Center, Washington, D.C., 1997, p. 721.
[279] Jim A. Davis, "The Looming Biological Warfare Strom", **Air & Space Power Journal**, Vol. 17, no. 1, Spring 2003, pp. 57-67.
[280] William H. Boothby, 2009, pp. 125-126.
[281] Gary D. Solis, p. 606.
[282] Yoram Dinstein, 2004, p. 76.

Convention (BWC), the first international treaty to forbid the development, production and stockpiling of an entire class of weapons. The convention was opened for signature on 10 April 1972 and entered into force on 26 March 1975.[283]

The Biological Weapons Convention is constituted of fifteen articles. Briefly, the convention encumbers "States party undertake never in any circumstances to develop, produce, stockpile or otherwise acquire or retain microbial or other biological agents or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes, and weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict." The Convention is implemented in both international and non-international armed conflicts.[284]

3.2.3 Nuclear Weapons

Nuclear Weapons are the most catastrophic devices ever made by humankind. Nuclear Weapons can destroy a whole city, kill simultaneously millions of people, and contaminate a wide environmental area for long decades through radioactivity. Although the nuclear weapons were used two times and tested over 2000 times since they were developed, the United Nations could not be successful to entirely ban nuclear weapons like chemical and biological weapons.[285]

The distinction between conventional explosive and nuclear explosive must be given before defining nuclear weapons. When conventional explosives detonate, the energy releases by means of chemical reaction that involve a rearrangement among atoms of hydrogen, carbon, oxygen and nitrogen in the

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[283] United Nations Office for Disarmament Affairs – UNODA, "**The Biological Weapons Convention**", UN News Center. http://www.un.org/disarmament/WMD/Bio/, (05.05.2016).

[284] Boothby, 2014, pp. 166-67.

[285] United Nations Office for Disarmament Affairs (UNODA), "**Nuclear Weapons**", Weapons of Mass Destruction. http://www.un.org/disarmament/WMD/Nuclear/, (07.05.2016).

chemical high explosives such as TNT, H-6.[286] However, in the context of nuclear detonation, matter and energy are interchangeable with one another. A small amount of matter can be converted into a huge amount of energy.[287] *Glasstone* defines this process as follows: “When a free neutron enters the nucleus of a fissionable, it can cause the nucleus to split into two smaller parts. This process is called “fission”. The key items of nuclear weapons are platinum and uranium. One pound of these materials can release energy as much as 8,000 tons of conventional TNT[288] explosives. The secondary type of nuclear process is the nuclear fusion process. Glasstone defines this as “a pair of light nuclei (two hydrogen) unite together to form a nucleus of a heavier atom (one helium).” Compared with fission, one pound of hydrogen isotope deuterium can release energy as much as 26,000 tons of conventional TNT explosives.[289]

As mentioned above, a nuclear explosion is more powerful than a conventional explosion. Another distinction is that the temperature of nuclear explosion (several tens of millions of degrees centigrade) is higher than a conventional explosion (few thousand degrees). A nuclear explosion emits thermal energy in the form of light and heat. Thermal energy causes severe skin burns and fires at long distances.[290] The most crucial distinction between nuclear and conventional explosives is the effect of nuclear radiation. Nuclear radiation compromises of 5% initial ionizing radiation (neutrons and gamma rays emitted within the first minute after detonation), and 10% residual nuclear radiation. Residual nuclear radiation is the permanent radioactive hazard in fallout.[291] Particularly, gamma rays can travel long distances and penetrate considerable thicknesses. Gamma rays and neutrons can cause severe

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[286] Samuel Glasstone and Philip J. Dolan. “**The Effects of Nuclear Weapons**”, US Dept. of Defense, Washington, 1977, p. 662.
[287] Joseph M Siracusa, “**Nuclear Weapons: A Very Short Introduction**”, Oxford University Press, Oxford, 2008, p. 161.
[288] **TNT and H-6** high explosives are used for military purposes, especially main charge in bombs.
[289] Glasstone, p. 5.
[290] Siracusa, p. 5.
[291] John Pike, "Nuclear Weapon Effects", **The Federation of American Scientists (FAS)**. http://fas.org/nuke/intro/nuke/effects.htm, (08.05.2016).

permanent injury and health problems on human body.[292] Due to the radioactivity of the fission material in the weapon residues, or debris, fallout causes residual nuclear radiation. The residual nuclear radiation is permanent and emits gamma and neutron radiation; as a result, it causes long and severe environmental radioactive contamination.[293]

Biological effects of the nuclear explosion on the human body are classified as blast injury, burn injury and nuclear radiation injury. Blast injuries are associated with blast effects due to air blast overpressure similar to conventional explosions. Thermal radiation can cause severe skin burns. The flash of thermal radiation from the fireball can cause direct flash burns in a few seconds. The temperature of skin reaches 70 centigrade degrees. The secondary types or contact burns are resulted from hot objects and huge flames. According to the degree of skin burns, the injury will recover within two or three weeks.

The effects of nuclear radiation arising from nuclear explosion are excluded from the conventional explosions. The ionization radiation is a harmful effect of the nuclear explosion. As mentioned above, the nuclear explosion causes gamma, beta, alpha and neutron emissions. Especially, neutron and gamma emission can penetrate into body tissues. In the high level of exposure, ionization radiation can damage chromosome of the cells and the process of cell division is delayed because of ionization. Depending upon the level of exposure, the wounded can die within minutes or several years because of various suffering cancer diseases.[294]

Firstly, atomic bombs were used against the Japanese cities of Hiroshima and Nagasaki, on 6 and 9 August 1945.[295] On the morning of 6 August 1945, a B-29 bomber dropped an atomic bomb (the explosive force of 20,000 tons of TNT) over the city of Hiroshima. Because of airburst nuclear detonation, 80,000 to 140,000 people were killed instantly and more than 100,000 people were seriously injured. Three days later, on 9 August 1946,

[292] Glasstone, p. 8.
[293] Siracusa, p. 5.
[294] Glasstone, pp. 541-586.
[295] William H. Boothby, 2009, p. 216.

another B-29 bomber dropped an atomic bomb (the explosive force of 22,000 tons of TNT) on Nagasaki. More than 24,000 people were killed and over the 23,000 people were wounded seriously.[296]

After the nuclear attacks, four types of injury phases were prominent. During the first two weeks, predominantly, injuries were originated from burns caused by rays and flames, and wounds from blast and fragmentation. In the third and eighth weeks, the symptoms of loss of hair, anemia, loss of white cells, bleeding and diarrhea arose from damages of radioactive rays. Approximately 10 percent of the wounded died because of these symptoms. The third phase occurred in the third and fourth months. After those secondary injuries of disfiguration, increases in burn, trauma, and even radiation injuries, severe scar formations, blood abnormalities, sterility and psychosomatic disorders were seen as symptoms. For more than half a century, many symptoms of nuclear explosions continued to be seen such as leukemia; a-bomb cataracts; cancers of the thyroid, breast, lungs and salivary glands; birth defects, including mental retardation, and fears of birth defects in children; and disfiguring keloid scars.[297]

After Second World War, international community sought to control their proliferation due to their threat against world peace. The United Nations General Assembly established the Atomic Energy Commission in 1946. The Commission was in charge of examination and consultation arising from problems of nuclear armaments.[298]

Although biological and chemical mass destruction weapons are banned under the international law, nuclear weapons are not subject to the prohibition of any treaty.[299] Up to now, nuclear weapons are not prohibited by any the Law of Armed Conflict (LOAC). In this sense, nuclear weapons are the exceptional circumstance in world politics. Owing states have used nuclear weapons not only as deterrence for military purpose but also as means of political repression

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[296] Siracusa, pp. 22-23.
[297] Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel, **Nuclear Weapons under International Law**, Cambridge University Press, Cambridge, 2014, pp. 5-7.
[298] William H. Boothby, 2009, p. 216.
[299] Yoram Dinstein, 2004, p.77.

in international politics. The only document in relation to nuclear weapons is the Nuclear Non-Proliferation Treaty (NPT). NPT limits proliferation of nuclear weapons or other nuclear explosive devices (not delivery systems) and bans nuclear tests and other nuclear explosions in outer space, among other places, except state's own territory. Moreover, NPT brings arrangements of the proliferation of ballistic missiles.[300]

Respectively, in 1993 and 1994, the World Health Organization (WHO) and the United Nations General Assembly adopted resolutions for the International Court of Justice (ICJ) to give an advisory opinion whether a "threat or use of nuclear weapons by a state in any circumstances during conflict in the breach of international law or not?"[301] The International Court of Justice adjudicated on the use of nuclear weapons on 8 July 1996. According to the verdict, ICJ referred to existing treaties, such as the Comprehensive Nuclear-Test-Ban Treaty (CTBT), Outer Space Treaty, Latin America Nuclear Weapons Free Zone Treaty, African Nuclear-Weapons-Free Zone Treaty, Seabed Arms Control Treaty, as to prohibiting the deployment and test of nuclear weapons in certain regions such as Antarctica, outer space and seabed may foreshadow a future general prohibition of nuclear weapons. The ICJ adjudicated that "the threat and the use of nuclear weapons would generally be contrary to the rules of international customary law."[302] Thus, ICJ held that "a threat or use of force by means of nuclear weapons that is contrary to Article 2, paragraph 4 of the United Nations Charter and that fails to meet all the requirements of Article 51 is unlawful." Nevertheless, if in circumstances of self-defense for the survival of the state is at stake, the court could not adjudicate definite judgment whether the threat and the use of nuclear weapons would be lawful and unlawful.[303] According to Christopher Greenwood, The ICJ's advisory opinion is crucial, because not only the unlawful of threat or the use of nuclear weapons is based on the UN Charter and international

[300] Duncan Blake, "The Law Applicable to Military Strategic Use of Outer Space", **The New Technologies and The Law of Armed Conflict**, Ed. Nitoshi Natu and Robert McLaughhlin, Asser Press, The Hague, 2014, p. 124.
[301] William H. Boothby, 2009, p. 220.
[302] Yoram Dinstein, 2004, p. 77.
[303] Green, pp. 129-130.

humanitarian law but also based on human rights and environmental law. Besides, *Greenwood* emphasizes that

> *In absence of a specific prohibition of nuclear weapons, any prohibition or limitation of their use had to be derived from the application of more general principles. In this context, the Court referred, in particular, to the prohibition of weapons calculated to cause unnecessary suffering, of attacks upon civilians and of the use of indiscriminate methods and means of warfare, and to the principles protecting neutral States from incursions onto their territory.*[304]

However, the use of nuclear weapons against cities is undoubtedly unlawful, but the use of tactical nuclear weapons on the battlefield far distant from civilian residential areas (in the desert or in the middle of the ocean, etc.) would be appearing lawful. On some instances, it could be evaluated as unlawful. Unnecessary suffering to combatants is another consideration as to the humanitarian law. The court stated that humanitarian law, at very early stage, prohibited certain types of weapons either because of their indiscriminate effect on combatants and civilians or because of the unnecessary suffering caused to combatants, that is to say a harm greater than that unavoidable to achieve legitimate military objectives. Consequently, unnecessary suffering caused to combatants is sufficient factor in determining the unlawfulness of tactical weapons.[305]

3.3. OTHER PARTICULAR WEAPON SYSTEMS

Besides the prohibition of specific weapons by the treaties of the law of weaponry, there are undefined and controversial cases of weapon systems in the context of the law of weaponry. Each weapon has distinctive features, effects, and intended military purposes. In the following sections, these weapon systems will be analyzed under the principles of the customary international law; thereby particular cases of conflicts will be given.

[304] Christopher Greenwood, "The Advisory Opinion on Nuclear Weapons and the Contribution of the International Court to International Humanitarian Law.", **International Review of the Red Cross**, Vol. 37, no. 316, 1997, p. 65.
[305] Leslie C. Green, pp. 130-131.

3.3.1 Bombs, Missiles, and Rockets

Even if bombs, missiles, artillery, and rockets have distinctive features, they have similar specifications in which each of them carries a conventional warhead to destroy the military objective by means of heat, fragmentation, and blast.[306] The two crucial fundamental customary principles of the law of weaponry are the weapon discrimination capability and whether superfluous injury or unnecessary suffering is inflicted on human body via bombs, missiles, artillery or rockets.[307]

In the case of weapons (bombs, the rockets, the artillery, and missiles) that cause unnecessary suffering to combatants, they violate one of the customary principles of the law of weaponry.[308] However, *William H. Boothby* emphasizes that each weapon should be assessed having regard to their hazardous blast and fragmentation distance range and whether expected average injury results prior the mission planning level.[309]

These weapon systems also have the capability to distinguish between civilian and military targets. Moreover, if a weapon system has an unguided specification, the planner or executor of the air campaign must consider their indiscriminate results. The primary concern is not their indiscriminate features, and how to use a weapon in the armed conflict.[310] Sometimes, air delivered bombs can be employed in land or sea mines to prevent sea or land movement of the enemy. In the circumstances of air delivered bombs fused with the time delayed or metal activated fuses.[311] In the circumstances, the air dropped bombs will have indiscriminate features to any possible targets whether civilians or military. In case of indiscriminate attacks, the incidents of the V-1 and V-2 rocket strikes aimed at London during the Second World War and the

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[306] William H. Boothby, 2009, p. 224.
[307] William H. Boothby, 2014, p. 172.
[308] Yoram Dinstein, p. 62.
[309] William H. Boothby, 2009, p. 225.
[310] Yoram Dinstein, p. 62.
[311] ICRC, "**Weapons That May Cause Unnecessary Suffering or Have Indiscriminate Effects**", Report on the Work of Experts, Geneva, 1973, p. 50.

firing of the Iraq Scud missile strike at Israel and Saudi Arabia during First Gulf War are historical examples of indiscriminate attacks.[312]

With technological development of computer-based guidance systems, the use the smart munitions have increased in the battlefield. The uses of the smart munitions have reduced the rate of collateral damages in conflicts. However, in the circumstances of the use of dump or unguided weapons in the air raids, the planner or executor of the air campaign must consider the principle of discrimination between civilian and military objective thereby should calculate and review the effects of the blast and fragmentation.[313]

3.3.2 Blast Weapons

Blast weapons are designed to destroy against soft targets including personnel, aircraft, unreinforced buildings, missiles, communication equipment and, non-armored vehicles both in the open and within protective structures.[314] They can be used for different kinds of forms such as bombs, grenades, and rockets. Blast weapons also described as fuel air explosives (FAE) in military literature.[315] Fuel-air explosives are weapons which include an explosive device, inflammable liquid, gas, or powder. The working principle of FAE is relatively different from other weapon systems. Firstly, FAE munition forms vapor cloud formation by means of sprayed inflammable liquids (liquid hydrocarbon). Then, with ignition of explosive devices, the vapor cloud formation is detonated. The detonation generates high-power blast affects more than any other classical weapons.[316]

At first, the US forces used blast weapons (FAE bombs) during Vietnam War.[317] In addition to the United States, Russia, China and Israel

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[312] Gary. D. Solis, p. 537.
[313] William H. Boothby, 2009, pp. 225-227.
[314] P. Dearden, "New Blast Weapons", **Journal of the Royal Army Medical Corps**, Vol. 147, 2001, pp. 80-86.
[315] William H. Boothby, 2009, pp. 233-234.
[316] R. R. Baxter, p. 57.
[317] G. Liu, F. Hou, B. Cao, L. Xie, Zh. Shen, and T. Zhou, "Experimental Study of Fuel–Air Explosive", **Combustion, Explosion, and Shock Waves**, Vol. 44, no. 2, 2008, pp. 213.

developed blast weapon technology in many weapon systems.[318] For instance, the Soviet Union produced its FAE bomb and used against China in a 1969 border conflict.[319] Furthermore, Russia deployed various types of blast weapons in Afghanistan and the Chechen Wars. Moreover, the US modified Hellfire missile with thermobaric warhead to use against insurgents in Afghanistan.[320] USA, Russia, China have the significant number of the stockpile of FAE munitions in their arsenal. Currently, there exists 22 different kinds of weapons systems that can be delivered by means of air dropped, air delivery, bomblet, multiple launch rocket system, helicopter launched, ground launched.[321] Apart from the purpose of destruction of the enemy target, an Israel firm produced an antitank minefield clearing and IED neutralization system named CARPET. The system consists of twenty rockets equipped with fuel air explosive (FAE) warheads.[322]

Blast weapons may cause the very high ratio of deaths or injury of combatants or civilian because of fire and particularly blast effects. It is asserted that indiscriminately, the blast weapons have caused painful death or injury to the combatants and civilians.[323] *Ove Bring* comments "death from blast injuries is probably one of the most terrible ways of dying, possibly even worse than death from burns….Death from severe lung injury is an appallingly painful and agonizing process, taking any time up to half an hour." Blast reaches lungs through airways. Exposed victim will be choked by means of bleeding caused by the ruptured lungs.[324]

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[318] P. Dearden, p. 86.

[319] HRW, "Backgrounder on Russian Fuel Air Explosives", **Human Rights Watch**, (01.02. 2000). https://www.hrw.org/report/2000/02/01/backgrounder-russian-fuel-air-explosives-vacuum-bombs, (21.05.2016).

[320] Dr. Anna E. Wildegger-Gaissmaier, PhD, "Aspects of Thermobaric Weaponry." **ADF Health Journal**, Vol. 4, April 2003, pp. 3-6.

[321] The International Mine Action Standards (IMAS), "Fuel Air Explosive Systems", **Technical Notes for Mine Action (TNMA)**, July 2013. http://www.mineactionstandards.org/standards/technical-notes-for-mine-action-tnma/, (21.05.2016).

[322] University of California Press on behalf of the Institute for Palestine Studies, "The Israeli Arsenal Deployed against Gaza during Operation Cast Lead", Journal **of Palestine Studies**, Vol. 38, no. 3, Spring 2009, p.186.

[323] R. R. Baxter, p. 57.

[324] Ove Bring, p. 279.

Dr. Anna E. Wildegger-Gaissmaier gives the blast effects of FAE on the human body as follows:

> *In the human body, the shock wave/blast interacts with many types of tissues (e.g., skin, fat, muscle and bone) that differ in density, elasticity and strength. Each tissue type, when interacting with a blast wave, is compressed, stretched, sheared or disintegrated by overload according to its material properties. Internal organs that contain air (sinuses, ears, lungs and intestines) are particularly vulnerable to blast. The whole body may also be thrown by blast wind, which can result in fractures. Besides the obvious blast injuries, recent research has shown that there are neurological, biochemical and blood chemistry changes caused by blast effects.*[325]

In given circumstances, the use of blast weapons can be evaluated as a violation of the St. Petersburg principle that they 'uselessly aggravate the sufferings of disabled men, or render their death inevitable.' Nevertheless, a combatant would be exposed to similar effects of conventional munitions including heat, fragmentation, and blast. The crucial distinction of blast weapons is that they have more powerful blast effects than conventional weapons.[326] *William H. Boothby* has the similar attitude on the infringement of blast weapons: "the reviewer will compare quantitative and qualitative levels of injury and suffering". The balanced conclusion will be evaluated related to whether the blast effect exceeds the level of suffering or injury caused by conventional weapons.[327]

The legal status of FAE was assessed during the UN Conference on Conventional Weapons at Geneva in 1978. Nevertheless, FAE was considered to have no connection with prohibition under the Law of Armed Conflict (LOAC) due to the nonexistence of any inhumane effect.[328] There is no binding document as to the prohibition of FAEs in the law of armed conflict.[329]

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[325] Dr. Anna E. Wildegger-Gaissmaier, p. 5.
[326] Ove Bring, p. 279.
[327] Willaim H. Boothby, 2009, p. 234.
[328] Ove Bring, p. 279.
[329] William H. Boothby, 2009, p. 235.

3.3.3 White Phosphorus

White phosphorous (WP), is a colorless or yellow, translucent, white waxy solid substance.[330] WP spontaneously ignites upon exposure to oxygen at temperatures l0-15 degrees, producing a yellow flame with dense, bright white smoke and garlic-like smell.[331]Although WP has industrial usages such as soft drinks and toothpaste,[332] in the military applications, white phosphorus is used in ammunitions such as mortar and artillery shells, and grenades. The munitions containing white phosphorus have been used by armies, not only for identifying or for locating military targets but also used for burning or damaging enemy combatants.[333]

White phosphorous came into use for various purposes for the militaries in the World War I. WP munitions were also used increasingly during the World War II.[334] During the Korean War, white phosphorus caused burns off 312 US personnel through white phosphorus. After that, nearly 8,000 casualties had white phosphorus burns in the Vietnam War.[335] WP was also used by the Russian Military in Grozny, Chechnya in 1994.[336] According to a documentary film by the Italian state television, on November 8, 2004, the United States was accused of using artillery-delivered WP munitions against insurgents in the battle for Fallujah, Iraq.[337] The UN arms monitors accused Ethiopia of using WP against both insurgents and civilians in Somalia in 2007.[338] Two years later, during the Operation Cast Lead, the Israel Defense Forces (IDF) used white phosphorus artillery munitions against civilian populated areas in Gaza

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330 Gary D. Solis, p. 597.
331 Penny Duerksen, Patricia Richter, Lisa Ingerman, Sujatha Thampi, William Ruoff, and Steven Donkin. **"Toxicological Profile for White Phosphorus."**, US Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Atlanta, 1997, pp. 248.
332 Gary D. Solis, p. 597.
333 Penny Duerksen, p. 2.
334 Stian N. Christensen, "Regulation of White Phosphorus Weapons in International Law", **Master Thesis, University of Oslo**, 2011, pp. 10-11.
335 Ronald F. Bellamy, Russ Zajtchuk, and Teresa M. Buescher, "**Conventional Warfare: Ballistic, Blast, and Burn Injuries**", Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D.C. 1991, pp. 410.
336 Penny Duerksen, p. 10.
337 Gary D.Solis, p. 598.
338 Penny Duerksen, p. 10.

in 2009. The strikes caused killing and injuring of hundreds of civilians and damaging infrastructure. According to the New York Times, in October 2011, the US and coalition forces in Afghanistan used white phosphorus munitions against Taliban insurgents.[339]

However, WP munitions were used by not only states but also paramilitary and terrorist groups used WP in their strikes. Hamas fired a WP shell in the direction of Sedro in Israel on 14 January 2009. Moreover, in Afghanistan, the Taliban have used WP in their attacks against the Coalition and civilian targets extensively.[340]

With respect to effects of white phosphorus on the human body, while the ablation of fragments of other classical high explosive (HE) munitions from human body is not required, fragments of munitions that are contaminated with white phosphorus must be excised.[341] When WP comes into contact with the human skin, WP causes both chemical and thermal burns.[342] The effect of thermal burns causes skin burns by heat. Phosphorus ignites spontaneously in air at 44' C and produces a temperature of about 8000 C.[343] However; the chemical burns result from several different chemical compounds that are produced by means of chemical reactions. Depending on the quantity and size of WP particles, WP can damage deep into underlying the human tissues and internal organs,[344] and as far as any underlying bone, until the burning WP is extinguished due to a lack of oxygen by smoldered WP particles.[345] Even WP can cause the death of exposed humans. In case of WP burn wounds, the human body or skin can absorb phosphorus and show multiple organ dysfunction syndromes of erythrocytes, kidneys, liver, and heart.

[339] Stephen Goose and Bonnie Docherty, "White Phosphorous: The New Napalm?", **Human Rights Watch**, (08.06.2012). https://www.hrw.org/news/2012/06/08/white-phosphorous-new-napalm, (12.05.2016).
[340] Stian N. Christensen, "Regulation of White Phosphorus Weapons in International Law", **Master Thesis, University of Oslo**, 2011, pp. 10-11.
[341] Ronald F. Bellamy, Russ Zajtchuk, and Teresa M. Buescher, p. 49.
[342] Christensen, p. 8.
[343] Ronald F. Bellamy, Russ Zajtchuk, and Teresa M. Buescher, p. 49.
[344] Christensen, p. 8.
[345] I.J. MacLeod and A.P.V. Rogers, "The Use of White Phosphorus and the Law of War", **Yearbook of International Humanitarian Law**, Vol. 10, December 2007, pp. 75 – 97.

Consequently, the treatment of WP burns is a significant in terms of healing process that is associated with the degree of exposure.[346]

There is no binding document for the prohibition of white phosphorous as a means of warfare in the international law. However, like other incendiary devices, the use of WP as a means of the military offensive against civilians, a civilian object is banned in international law. The use of white phosphorous in Iraq and Gaza initiated a debate about indiscriminate effects and particularly nature of the superfluous injuries whether unlawful or not in the international humanitarian law.[347]

The issue of the use of white phosphorous as a means of military purpose should be evaluated in three categories: as chemical weapons, as incendiary weapons, and in customary international law.

Gary Solis points out that;

> *Like virtually all weapons, WP contains chemicals, but chemical content does not make it a chemical weapon. To be a chemical weapon it must not only be chemical in nature, but its military uses must also be proscribed by the CWC. The primary military uses of WP munitions are to create smoke screens, provide illumination, and for incendiary purposes. These uses are permitted by the CWC Article 11.9 (c). In other words, a weapon's primary military uses, not the weapon's collateral effects, determine its character.*[348]

By contrast, *I. J. MacLeod and A. P. V. Rogers* emphasized that according to definitions of toxic chemical agents in Article 2 of CWC, WP has the potential to be classified as a chemical weapon under Article II(1)(a). There is the probability of use of WP as a chemical weapon because of its various harmful physiological effects.[349]

The second debate as to whether Protocol III includes WP as a prohibited incendiary device. The incidental incendiary effects of WP are not included in the Protocol III of the Convention on Conventional Weapons. Unfortunately, most of the conventional weapons have incendiary effects along with fragmentation and blast effects of the conventional weapons. *William*

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346 Christensen, p. 8.
347 Mariëlle Matthee, Brigit Toebes, Marcel Brus (Ed.), p. 160.
348 Gary D. Solis, p. 598.
349 I.J. MacLeod and A.P.V. Rogers, "The Use of White Phosphorus and the Law of War", **Yearbook of International Humanitarian Law**, Vol. 10, December 2007, pp. 75 – 97.

Boothby stated that the evaluation of the WP munitions should determine exactly what it has been designed to do and be considered in relation to the definition of the incendiary weapons.[350] However, if WP munitions are not designed as incendiary weapons, and if WP munitions are designed for illumination or smokescreen, even if that munition is used directly against personnel, the use of WP munitions are legitimated by the international law. [351]

The final evaluation is related to the customary international law. WP munitions should be evaluated under the general rules of law of weaponry including the superfluous injury and the prohibition of weapons of nature to be indiscriminate.[352] The International Court of Justice emphasizes one of the cruxes of the customary law which is the unnecessary suffering rule. According to ICJ's formulation, 'it is prohibited to cause unnecessary suffering to combatants: it is accordingly prohibited to use weapons causing them such harm or uselessly aggravating their suffering'. From the perspective of principle of unnecessary suffering, it is significant that WP munitions can be prohibited if the use of WP is targeted against combatants.[353]

3.3.4 Flechettes

First time in history, the Italian Air Force dropped flechettes against the Ottoman Forces in 1911-1912 during the Italy-Turkish War.[354] After that, the flechettes were widely used by either side of air forces during the First World War and the Second World War.[355] The United States Air Units launched flechettes which are scattered from canisters or buckets by means of aircraft and helicopter during the Korean War. Similarly, the US Air Forces used flechettes weapons during the Vietnam War and initiated new weapons debate

[350] William Hç Boothby, 2009, p. 245.
[351] I.J. MacLeod and A.P.V. Rogers, p. 95.
[352] William H. Boothby, 2009, p. 246.
[353] I.J. MacLeod and A.P.V. Rogers, p. 95.
[354] W. Hays Parks, "Conventional Weapons and Weapons Reviews", **Yearbook of International Humanitarian Law**, Vol. 8, 2005, pp. 55-142.
[355] Jon Guttman, "Flechettes: the weapon of choice for a lethal games of darts", **Military History**, 2010, p. 19.

about concerning the use of flechettes.[356] For example, the US Air Force dropped CBU-107 passive attack weapon, an air-dropped guided bomb that contained 3,750 steel and tungsten penetrator rods, against the Vietcong forces. Moreover, “Beehive” known as flechettes were also used by the US tankers and howitzer crews against mass enemy combatants.[357] The final historical example is that the Israel Defense Forces (IDF) deployed flechette shells in Gaza and Lebanon Conflicts in the years of 2001 and 2002. Flechettes killed or wounded dozens of civilians, including women and children.[358]

William Hays Parks describes flechettes (also known as sabot rounds) as “steel darts of varying sizes fired at high velocities in large quantities in munitions as small as a shotgun shell to as large as a 90mm tank round, 105mm artillery round and 106mm recoilless rifle round, enabling a uniform dispersion of flechettes to increase the probability of wounding enemy combatants within their path”.[359] Flechettes are designed for use against mass infantry attacks or enemy troops in open terrain. IDF has used flechette shells designed to disperse 5,000–8,000 razor-sharp, nail-like metal darts, each about 4 cm long flechette rods. Flechette shells can effectively scatter the rods in a cone-shaped pattern 300 yards long and 90 yards wide.[360]

There is no any specific binding document in relation to prohibition or restriction of the use of flechette under international law. Nevertheless, concerning discrimination principle, the use of flechette should be restricted in the urbanized terrain. In relation to the use of flechette shells in conflicts, the judgment of the Israel’s High Court of Justice is a crucial evaluation for the use of flechette. In 2003, in the case of Physicians versus O.C. Southern Command

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[356] Gary D. Solis, p. 578.
[357] Jon Guttman, p. 19.
[358] Harriet Sherwood, "Israel Using Flechette Shells in Gaza", **The Guardian**, 20.07.2014. http://www.theguardian.com/world/2014/jul/20/israel-using-flechette-shells-in-gaza, (16.05.2016).
[359] W. Hays Parks, p. 81.
[360] University of California Press on behalf of the Institute for Palestine Studies, “The Israeli Arsenal Deployed against Gaza during Operation Cast Lead”, Journal **of Palestine Studies**, Vol. 38, no. 3, Spring 2009, pp. 175-191.

in 2003,[361] the High Court of Justice reviewed the arguments of alleged by petitioners and IDF on the legality of the use flechette shells.[362]

The allegation of petitioners was based on the use of flechette, which did not discriminate between combatants and civilians. The flechette shells used by IDF caused collateral damages correlated with two incidents during the Gaza Conflicts in 2003. However, the respondents of the Southern Command asserted that the Convention on Certain Conventional Weapons of 1980 does not prohibit the use of flechette shells in conflicts.[363]

Parks commented that the High Court of Justice hold judgment of the use of flechette as legal under the Law of Armed Conflict (LOAC) because there are no binding documents as to ban of the flechette shells in the conflicts. However, the Court confirmed the excessive use of such weapons would be the violation of the discrimination rule of the customary law. The Court conceded that the use of flechette and similar weapons have potential threatening factors for civilian lives.[364]

Except for the rule of discrimination, Sweden, and other proponents criticized the use of flechette weapons. The flechette weapons may cause unnecessary suffering to military or civilian personnel who are hit by such weapons. The supporters of the prohibition of the use of flechette argued that flechette rounds can indiscriminately kill or/and cause severe and painful injury to civilians at closer ranges.[365] The argument of the proponents is based on the Hague Declaration of 1899. The Hague Declaration banned the use of expanding bullets that flattens easily on the human body. Nevertheless, wounding effects of the flechette was considered to have no severe

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[361] **Physicians for Human Rights and The Palestinian Center for Human Rights v. Doron Almog—O.C. Southern Command and The State of Israel—The Minister of Defence**, HCJ 8990/02, 27 April 2003, 203.

[362] Willaim H. Boothby, 2009, p. 242.

[363] **International Committee of the Red Cross (ICRC)**, "Israel - Practice Relating to the Use of Prohibited Weapons", Customary International Humanitarian Law. https://www.icrc.org/customary-ihl/eng/docs/v2_cou_il_ [7usofpr, (17.05.2016).

[364] David Turns, Weapons in the ICRC Study on Customary International Humanitarian Law, **Journal of Conflict & Security Law**, Vol. 11, no. 2, 2006, p. 215.

[364] William H. Boothby, **Weapons and the Law of Armed Conflict**, Oxford University Press, Oxford, 2009, pp. 79-80.

[365] R. R. Baxter, "Conventional Weapons under Legal Prohibitions", **International Security**, Vol. 1, no. 3, winter 1977, pp. 42-61.

implications than other lawful, kinetic energy projectiles and military small arms ammunition by the CCW conference participants. Until now, there was no need for any regulation of restriction or prohibition of the use of flechette. Similarly, US military doctors whose surgical experience in the Vietnam War stated that flechette wounds were not as severe as the wounds of standard grenade, mortar or artillery fragments.[366]

3.3.5 Depleted Uranium

According to the US Air Force Depleted Uranium Facts Sheets, "Depleted Uranium (DU) is what is left over when most of the highly radioactive types (isotopes) of uranium are removed for use as nuclear fuel or nuclear weapons" during the enrichment process of uranium.[367] Depleted uranium (DU) consists of about 60% of the radioactivity of uranium for the same mass.[368]

Depleted uranium is generally preferred for utilization of anti-armor because of its high density and pyrophoricity.[369] Another reason is that DU has low acquisition costs and the armor protection capability. The United States, Russia, United Kingdom, France and Israel deployed DU ammunition and armor plate to their military operation. For instance, the US A-10 Thunderbolt Aircraft use 30 mm. DU rounds;[370] furthermore, DU ammunitions are used by M1 Abrams and French Leclerc tanks.[371]

DU ammunition has greater penetration capability and can hit the enemy target from long distance than tungsten penetrators or high explosive anti-tank (HEAT) rounds. When the DU round strike on the armored target,

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366 W. Hays Parks, pp. 81-82.
367 Military Medicine, "Depleted Uranium Fact Sheet" **The Air University**, (04.08.1998). http://www.au.af.mil/au/awc/awcgate/dod/du_factsheet_4aug98.htm, (23.05.2016).
368 US Department of Veteran Affairs, "Depleted Uranium", **Public Health**, December 2014. http://www.publichealth.va.gov/exposures/depleted_uranium/index.asp, (23.05.2016)
369 Solis, p. 263.
370 Alexandra C. Miller, Ph.D., "**Depleted Uranium Properties, Uses, and Health Consequences**", CRC Press, New York, 2007, p. 230.
371 Robin Borrmann," The use of depleted uranium ammunition under contemporary international law: is there a need for a treaty-based ban on DU weapons?", **Medicine, Conflict and Survival**, Vol. 26, no.4, 2010, pp. 268-280.

DU penetrates armor plate, then generate very sharpening particles into the target (for instance tanks or armored vehicles). The particles of DU also simultaneously create the fire within the vehicle due to the pyrophoric nature of DU. [372]

DU weapons have been used in many conflicts since the first Gulf War in 1991. DU weapons were also used following the conflicts in Bosnia, Kosovo, Afghanistan and the invasion of Iraq in 2003.[373] Only the US and UK forces used 300 metric tons of DU ammunition in the last Iraq War. At the same time, the NATO forces fired approximately ten metric tons of DU ammunition during the Kosovo operation.[374]

Although Depleted Uranium has only 40-50 percent less radioactive than natural uranium, at impact, DU generates a cloud of dust particles and creates potentially severe health effects on both combatants and civilians in the immediate vicinity.[375]

The potential health and environmental effects of these weapons have been the controversial subject in the scientific community, governments and non-governmental organization since the first use of depleted uranium in the First Gulf War in 1991.[376] The United Nations Environment Programme (UNEP) carried out several field studies in conflict zones including Bosnia and Herzegovina, Kosovo, Serbia and Montenegro for the determination of environmental DU contamination. However, these surveys covered only the effects of environmental contamination.[377] According to the UNEP reports, DU contamination was found in the bio-examples of the Lichen and tree barks. These samples indicate the low level of presence of DU contamination in the trees. Moreover, UNEP identified the significant soil contamination near the destroyed tanks in Kosovo, Serbia, and Montenegro. One of the other crucial

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[372] "Depleted Uranium [DU]", **GlobalSecurity.org-Military**, http://www.globalsecurity.org/military/systems/munitions/du.htm, (23.05.2016).

[373] Gary D. Solis, p. 263.

[374] NATO, "Depleted Uranium", NATO Information, May 2000. http://www.nato.int/du/docu/d000500e.htm, (23.05.2016).

[375] Gary D. Solis, p. 263.

[376] Karen Hulme, "Radiation Warfare: Review of the Legality of Depleted Uranium Weaponry", **Canadian Yearbook of International Law**, Vol. 43, 2005, pp. 197-296.

[377] Alexandra C. Miller, p. 240.

conclusion is that UNEP stresses potential contamination of drinking water and soil because of residuals of depleted uranium ammunitions under the ground.[378] The International Atomic Energy Agency (IEAE) conducted research concerning DU contaminations at eleven sites where the strikes with DU ammunitions happened in Kuwait in 2002. According to the IEAE results, “potential annual radiation doses arising from exposure to depleted uranium residues are very low and of little radiological concern."[379] Besides the reports of UNEP and IEAE, the Iraqi scientists discovered the DU contamination in air, soil, and water samples collected in the southern provinces of Iraq in 1998 and Basra in 2000. The level of radiation is eighty-four times higher than the recommendation of the WHO.[380]

According to the World Health Organization (WHO), potentially depleted uranium has both chemical and radiological toxicity against the kidneys and the lungs. The chemical and radiological toxicity to create health problems for patients depend on the level and duration of exposure. According to long-term studies of workers exposed to uranium, DU caused some renal impairment in time. Nevertheless, WHO emphasized that if the sources of DU exists, kidney impairment returns to normal function. Moreover, in circumstances of inhaled uranium particles of 1-10 μm in size, symptoms of lung cancer or lung disease may be noticed if the patient is exposed to high quantity radiation in long retention time.[381] Based on research of *Asaf Durakovic*, “the presence of elevated levels of depleted uranium in the respiratory system of veterans of the Gulf conflict after nine years of exposure has been confirmed.” The particles of DU is mixed with blood via lungs and then distributed throughout the whole body. Finally, DU permanently settles in the bones, brain, liver, kidneys, heart, lymph nodes, testes, and spleen.[382]

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[378] Karen Hulme, pp. 226-227.
[379] Karen Hulme, p. 215.
[380] Karen, Hulme, p. 225.
[381] "Depleted Uranium: Sources, Exposure and Health Effects", **World Health Organization (WHO)**, 2001.
http://www.who.int/ionizing_radiation/pub_meet/en/DU_Eng.pdf, (25.05.2016).
[382] Karen Hulme, p. 219-220.

In another instance, some of the US armored vehicles (Bradley and Abrams Tank) were struck by DU munitions because of friendly fire during the First Gulf War. Thirteen soldiers were killed, and about 50 soldiers were severely wounded. These wounded soldiers were exposed to minuscule particles of DU through inhaled, ingested or implanted. The fragments of DU retained in their body's personnel dissolve in blood systems in time. Then, they are transferred to other organs and tissues and excreted in urine. The US Baltimore Veterans Administration Medical Follow-up Program managed to obtain information on health and medical conditions of survived veterans of this incident. There were no indications of kidney disease and other related impairments.[383]

William H. Boothby remarks that DU has become the controversial issue because of health consequences. There is no any consensus about certain health effects on the human body or environment. He emphasizes that if the circumstance of DU is to be studied based on international humanitarian law, the customary core principles of indiscrimination, the superfluous injury must be considered. At the same time, the possible environmental contamination of DU should be seen in reference to widespread, long-term and severe damage principles.[384]

There is no binding treaty as to prohibition or restriction of the use of DU in armed conflict.[385] As mentioned above, even if toxicity and side effects of DU are approved under the existing treaties, the prohibition or restriction of the use of DU ammunition is impossible. The definition and specifications of DU do not match any existing treaty based weapon bans. However, in spite of the lack of any binding treaty, the circumstances of DU should be evaluated under the law applicable in armed conflicts. The Additional Protocol I, Article 35 (1) binds that 'in any armed conflict, the right of the parties to a conflict to choose methods or means of warfare is not unlimited.' The use of DU should

[383] Dr. Alex Bordujenko, " Risk assessment: exposure to depleted uranium", **ADF Health Journal**, Vol. 4, April 2003, pp. 10-11.
[384] Boothby, 2009, pp. 243-244.
Note: Dr. Asaf Durakovic is the professor of Uranium Medical Research Centre in the United States.
[385] Karen Hulme, p. 233.

be evaluated as the highly likely violation of the customary principles of the law of weaponry including the principle of distinction, the principle of proportionality, the prohibition against superfluous injury or unnecessary suffering and the protection of the natural environment by planner and executor of the air raids.[386]

3.4. EXPLOSIVE REMNANTS OF WAR

With the development of long-range artillery systems, rockets, and air-dropped explosive charged weapon systems, conflicts began to occur not only on the battlefields but also in covered urban areas including cities and villages in the last century. Initially, the large-scale collateral damage was first seen during the First World War. The use of explosively charged weapon systems has increased dramatically following the great and small wars against cities.[387] Public properties, vehicles, and infrastructures may be destroyed or damaged through weapon systems. In general, the weapon systems are designed to destroy enemy targets. Thus, the weapons systems are expected to achieve its missions by user states. However, munitions may fail to succeed their mission because of technical failure or ignoring bomb pattern.[388]

Gary Solis defines them as follows: “explosive remnants of war (ERW) are munitions fired or dropped during the armed conflicts that fail to explode, or that are abandoned on the battlefield – the deadly detritus of modern war.”[389] In brief, ERW is a remain of unexploded ordnance after the conflict. The term “ERW” is given in the UN CCW Protocol V as ‘unexploded ordnance and abandoned explosive ordnance. ERW includes all other explosively weapon systems such as mortar ammunitions, grenades, rockets, artillery shells, air-

386 Robin Borrmann, pp. 270-275.
387 Maya Brehm, “**Protecting civilians from the effects of explosive weapons: an analysis of international and legal policy standards**”, United Nations Publications, New York: United Nations, 2012, p. 1.
388 William H. Boothby, 2009, pp. 297-298.
389 Gary D. Solis, p. 588.

dropped bombs, missiles.[390] ERW also include mines, unexploded ordnance (UXO) and cluster munitions.[391]

ERW has distinctive characteristics except for land mines. ERW causes more collateral damage than landmines because of including more explosive. People interact with ERW, in that they are generally located on the surface. Owing to their visibility, civilians are prone to ignore them, which create risks. Sometimes, UXO is designed to kill EOD (Explosive Ordnance Disposal) technicians during the defusing procedures. They may have an anti-disturbance system or clockwise. Due to lack of knowledge of their dangers and the colorful and attractive design of ERW, ERW creates more risks for civilians, especially children.[392]

Unexploded ordnance (UXO) and other explosive remnants of war (ERW) kill and mutilate a large number of civilians each year. For instance, Poland detonated and defused approximately 74 million explosive remnants of the Second World War between 1945 and 1985. Moreover, in Laos, about 11,000 people have been killed owing to ERW since 1973. After the Kosovo War was over, approximately 492 civilians were killed or injured in Kosovo because of UXO and ERW. In addition to these countries, in Afghanistan, Chechnya and Iraq, thousands of people have suffered because of ERW. Progressively, the use of cluster munitions in the conflicts, the threat of ERW has dramatically increased due to unexploded submunitions.[393] According to ICRC, these explosive remnants of war kill more than 800 people and cause thousands of maiming per month. In Cambodia, more than 36,000 people were

[390] "Explosive Remnants of War and Mines Other than Anti-Personnel Mines", **Landmine Action UK**, March 2005, p. 6.
http://www.article36.org/wp-content/uploads/2008/10/global-impact-survey.pdf, (26.05.2016).
[391] A. Duttine, E. Hottentot, "Landmines and explosive remnants of war: a health threat not to be ignored", **Bulletin of The World Health Organization**, Vol. 91, no. 3, 2013, pp. 160-160A.
[391] Maya Brehm, 2012, p. 1.
[392] "Explosive Remnants of War and Mines Other than Anti-Personnel Mines", **Landmine Action UK**, March 2005, pp. 9-11.
[393] "Adoption of Fifth CCW Protocol on Explosive Remnants of War", **The American Journal of International Law**, Vol. 98, no. 2, April 2004, pp. 357-360.

disabled in the past decade. Furthermore, in Somalia, ERW caused 23,000 people to be mutilated because of ERW.[394]

Since most ERW accidents occur in rural and remote areas, many survivors have become permanently disabled because of mutilated body parts. Therefore, ERW causes social, economic and psychological issues. Survivors are excluded from their society and cannot participate in the workforce equally. Based on the Landmine Monitor 2012, 42% of civilian ERW accidents are regrettably children.[395] The ERW contamination area makes trouble for refugees who desire to return to their homes, farms and schools safely. The reconstruction of demolished infrastructure may also be costly and take a long time because of ERW.[396]

A group of governmental experts decided to negotiate the problem of ERW during the second review conference in 2001. After the ongoing debate in 2002,[397] the Protocol V to the CCW was adopted in 2003. *Maya Brehm* remarks that the Protocol includes only conventional munitions charged with explosive. The protocol excludes mines, booby traps, and other devices.[398] The party states are encumbered by the Protocol V to take required precautions and render safe procedures for UXO and ERW. Party states are also responsible to share information on their use of conventional weapons and control possible ERW contamination area in post-conflict.[399]

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[394] Arthur H. Westing, “Explosive remnants of war in the human environment”, **Environmental Conversation,** Vol. 23, no. 4, December 1996, pp. 283-285.

[395] A. Duttine, E. Hottentot, “Landmines and explosive remnants of war: a health threat not to be ignored”, **Bulletin of The World Health Organization**, Vol. 91, no. 3, 2013, pp. 160-160A.

[396] Maya Brehm, 2012, p. 4.

[397] “Adoption of Fifth CCW Protocol on Explosive Remnants of War”, **The American Journal of International Law**, Vol. 98, no. 2, April 2004, p. 358.

[398] Maya Brehm, 2012, pp. 43-44.

[399] ICRC,"1980 Convention on Certain Conventional Weapons & Factsheet", **International Committee of the Red Cross – Resource Center**. March 2014.
https://www.icrc.org/en/document/1980-convention-certain-conventional-weapons, (28.05.2016).

CHAPTER FOUR

THE FUTURE OF AIR FORCE UNDER THE LAW OF WEAPONRY

4.1. THE FUTURE OF WEAPONS LAW OF AIR FORCE

The warfare technology has developed rapidly in the last decades especially due to the development of informatics. Therefore, international law of conflict endeavors to respond to the challenges of new technological advances. The use of new weapons systems such as blinding laser, anti-personnel mines, and cluster munitions are arranged under the law of weaponry. However, the use of unmanned aerial vehicles (UAV), autonomous lethal weapons, cyber warfare, and nanotechnology should be analyzed and discussed in the law of weaponry by international lawyers and consultants.[400] Among those issues are the characteristics and the issues of the use of UAV or Unmanned Combat Aerial Vehicles (UCAV) as to the law of international armed conflicts, how the cyber warfare will be conducted under the international humanitarian law, what nanotechnology is legal and their implications, and finally, what autonomous weapon systems will result in international legal implications.[401]

4.1.1. Unmanned Aerial & Combat Vehicles – UAV & UCAV

Unmanned aerial vehicles (UAVs) are air vehicle that can be remotely piloted or whose partly characteristics of autonomously or semi-autonomously.[402] Besides definition of UAV, William Boothby emphasized another definition by some military circles that “The UK Future Air and Space

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[400] Robert Heinsch, “Methodology of Law-Making Customary International Law and New Military Technology”, **International Humanitarian Law and the Changing Technology of War**”, (Ed. Dan Saxon), Martinus Nijhoff Publishers, Boston, 2013, p. 18.
[401] William H. Boothby, 2014, p. 98.
[402] Ian Henderson and Bryan Cavanagh, “Unmanned Aerial Vehicles: Do They Pose Legal Challenges?”, “**New Technologies and the Law of Armed Conflict**”, (Ed. Hitoshi Nasu, Robert McLaughlin), Asser Press, 2014, p. 194.

Operating Concept defines remotely piloted air systems (RPA) as systems directly controlled by a human operator, and classes autonomous or highly automated systems as unmanned."[403]

The first examples of unmanned aerial vehicles (UAV) emerged in the early the 1900s.[404] The first example of the use of a UAV during armed conflict is that a hot air balloon equipped with a mechanical timer would remotely drop bombs at the adjusted time.[405] Particularly, the first modern version of UAV transpired after the Second World War. With the improvements in communication and information technology, the use of UAV has dramatically increased since the 1990s. The different versions of UAV and unmanned combat aerial vehicles (UCAV) were deployed in the Balkan war, Afghanistan and the Iraq war against terrorism.[406]

The first confirmed strike of UCAV was the killing of a senior al Qaeda lieutenant in Yemen by CIA. The operation was carried out by means of a Predator equipped with Hellfire missile in 2002.[407] Until 2006, the United States carried out at least nineteen air strike missions with Predator-UCAV equipped with Hellfire missile.[408] In 2006, the most significant air strike was the killing of Abu Musab al-Zarqawi who was in charge of Al-Qaeda in Iraq. The UCAV airstrikes have become more common day by day. CIA has conducted many UAV and UCAV operations in Afghanistan and Pakistan to kill and locate members of Taliban and Al Qaeda. However, the operations have been criticized because of the violation of proportionality.[409] With the globalization of terrorism, many states have been interested in obtaining UAV and UCAV to carry out their air operations for the air strike and reconnaissance role.[410]

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[403] William H. Boothby, 2014, p. 99.
[404] Mariëlle Matthee, Brigit Toebes, Marcel Brus (Ed.), "**Armed Conflict and International Law: In Search of the Human Face**", TMC Asser Press, The Hague, 2013, p.59.
[405] Ian Henderson and Bryan Cavanagh, p. 195.
[406] Mariëlle Matthee, Brigit Toebes, Marcel Brus (Ed.), p.59.
[407] Gary D. Solis, p. 539.
[408] The **AGM-114 Hellfire** is an air-to-surface missile, and used for anti-armor and anti-personnel purpose.
[409] Gary D. Solis, p. 541.
[410] William H. Boothby, 2014, p. 100.

The issue of the controller and crews of the UAV are important subjects preceding the use of UAV under LOAC. Since some controllers and crews of the UAV in non-international armed conflicts are civilians (such as CIA operators or civilian maintenance personnel), there is a debate in relation to whether the crews or controllers of UAV are under the obligation of the law of the armed conflict.[411]

The dramatic increase of deployment of UAV in the conflicts has caused ethical concerns as to the law of armed conflict. There is no any specific binding treaty either prohibiting or restricting the use of UAV in armed conflicts. However, the use of UAV in armed conflict should be evaluated according to the general principles and rules of law of weaponry and armed conflict.[412] For instance, if the UCAV is controlled by a pilot through the computer screen in Nevada, and this UCAV (for example predator) is deployed to the Bagram Air Base in Afghanistan, then targets suspected terrorist groups in Pakistan, it is debatable how this particular circumstance should be evaluated under LOAC. *Robert Heinsch* states that there are two possible approaches as to the situation of UAV under the law of armed conflict. The use of UAV may be prohibited or restricted completely or partially based on discrimination and proportionality principles.[413] Therefore, the principles of superfluous injury and unnecessary suffering are irrelevant. The planner or executor of the mission of UCAV should make discrimination between combatants and civilians through the equipment of the UAV such as sensors, camera or target acquisition systems. The planner or controller must be sure that the target is military objective and, take all precautions to avoid civilian loss of life and collateral damage. If the military objective is apparently considered as a civilian objective; the operator should suspend or cancel strike mission.[414] *Boothby* remarks that the planner and executor of UCAV mission should consider the principle of the proportionality rules prior to engagement of the enemy target. He also emphasizes that "the assessment of the lawfulness

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[411] Ian Henderson and Bryan Cavanagh, pp. 199-200.
[412] William H. Boothby, 2014, p. 101.
[413] Robert Heinsch, (Ed. Dan Saxon), pp. 20-22.
[414] William H. Boothby, 2009, pp. 231-232.

of the attack must continually be reassessed up to the point of that final decision shortly before weapon release, i.e. until the point when the attack can no longer be cancelled or diverted".[415]

Indeed, the UCAV is similar to piloted aircraft. It can be equipped with different kinds of weapons systems (such as Hellfire missile or Laser guided bombs). Therefore, the principle of proportionality is binding in the use of UCAV. The precision and accuracy of modern weapon systems offer clear advantages for planners or executors of UCAV operations. That is, they have more elasticity to use the minimum force necessary to achieve the military objective. The ability of wide selection range precision and accuracy weapon system and other auxiliary systems (sensor, radar or targeting systems) increase safety and security of friendly forces and reduce the chance of unnecessary casualties.[416]

4.1.2. Autonomous Weapon Systems

The military technology has been significantly developed and progressed in the last two centuries. Particularly, with the development of the information technology, the potential use of autonomous technology in the battlefields will be a milestone for future modern warfare.[417] Nevertheless, the autonomous weapons systems (AWS) have raised significant ethical, philosophical, moral, political and legal concerns because of their distinctive characteristics.

There is no consensus on the description of the AWS in the military literature. AWS is a machine or system that is entirely or partially self-controlled, have the ability to make decisions independently, to select and

[415] Willaim H. Boothby, 2014, p. 118.

[416] James C. Dawkins, "**Unmanned Combat Aerial Vehicles: Examining The Political, Moral, And Social Implications**", (Presented Master Thesis), School of Advanced Air and Space Studies Air University, Maxell Air Force Base, June 2005, pp. 27-28.

[417] Jeffrey S. Thurnher, "Examining Autonomous Weapon Systems from a Law of Armed Conflict Perspective", **New Technologies and the Law of Armed Conflicts**, (Ed. Hitoshi Nasu, Robert McLaughlin), Asser Press, The Hague, The Netherlands, 2014, p. 215.

engage targets without any human intervention.[418] *Kelly Cass* defines AWS as; "in general, an autonomous weapon is a machine capable of sensing and manipulating its surroundings with limited to no human control".[419] While many states have respectively autonomous weapon systems, no state have fully autonomous weapon systems in their inventory yet. However, according to military experts, AWS will be the primary weapons systems in the conflicts within two decades.[420]

The use of offensive lethal autonomous weapons is the focal point of debate under the law of weaponry. Especially, the fully autonomous weapons systems are systems that require no human intervention to take the decision to engage the enemy target. Although there is no existing entirely offensive lethal autonomous weapon system deployed in any current army, defensive autonomous weapon systems have been used in the conflicts by states. The semi AWS may be classified into two types as the man-in-the-loop and the man-on-the-loop systems, man-in-the-loop systems are wholly controlled by the human operator and the systems cannot take decisions independently without human interference. Most of the existing weapons systems are produced based on the man-in-the-loop algorithm. Moreover, the man-on-the-loop systems are operated using the computer algorithm. The man-on-the-loop systems permit to navigate, to target and, to make initial decision of strike independently. Yet, the human operators have the responsibility to observe all functions of the weapons system. Finally, the human operator confirms final decision to attack the enemy target.[421] The fully autonomous weapon systems can be defined as the man-out-of-the-loop systems that include selecting and delivering of weapons on the enemy targets without human interaction.[422]

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[418] Alexander Bolt, "The Use of Autonomous Weapons and the Role of the Legal Advisor", **International Humanitarian Law and the Changing Technology of War**", (Ed. Dan Saxon), Martinus Nijhoff Publishers, Boston, 2013, p.124.

[419] Kelly Cass, "Autonomous Weapons and Accountability: Seeking Solutions in the Law of War null", **Loyola of Los Angeles Law Review**, Vol. 48, no. 3, 2015, pp. 1017-1068.

[420] Jeffrey S. Thurnher, p. 213.

[421] David Akerson, "The Illegality of Offensive Lethal Autonomy", **International Humanitarian Law and the Changing Technology of War**", (Ed. Dan Saxon), Martinus Nijhoff Publishers, Boston, 2013, p.71.

[422] Jack M. Beard, "Autonomous Weapons and Human Responsibilities", **Georgetown Journal of International Law**, Vol. 45, no.3, 2014, pp. 617-682.

However, there are some advantages of the use of AWS in the battlefield. The AWS provides minimum loss of soldier for operator states. Another advantage is that AWS has very faster reaction time than any human can make. The system computer can analyze data and calculate all parameters to take the fastest decision to engage targets.[423] Many world armies have deployed the defensive or reconnaissance fully autonomous weapon systems. For instance, The US Navy used the Phalanx Close-In Weapon System to defeat close inbound missile and artillery rounds by reacting rapidly and autonomously when required through the lacking of the intervention of the human being in milliseconds. Similar air defense system like AEGIS, Patriot and, Israel Iron Dome, have been deployed by many countries automatically to engage inbound missiles, artillery rockets, and rounds.[424]

The concerns of the use of AWS should be evaluated under the four core principles of the law of armed conflict. Similarly, conventional weapons, AWS should avoid the violation of the principle of unnecessary suffering or superfluous injury. The principle of unnecessary suffering or superfluous injury forbids and restricts useless aggravation and inhumane suffering of combatants.[425] The law of weaponry prohibits weapons, which have characteristics of superfluous injury and unnecessary suffering. Nonetheless, even if the targeted military objective is legitimate, inevitably, the legal weapons cause terrible and harmful effects. In this sense, autonomous weapon systems are evaluated with other weapon systems. The main issue is derived from the unique characteristic of AWS's autonomous control.[426]

The AWS should be legal under the principle of the proportionality of the law of war. The principle of the proportionality forbids belligerents to carry out an attack in which the expected civilian casualties from an attack would be excessive compared to concrete and directly anticipated military advantage. How to adapt the principle of proportionality with autonomous

[423] Kelly Cass, p. 1027-1028.
[424] Jeffrey S. Thurnher, p. 216.
[425] Kenneth Anderson, Daniel Reisner and Matthew Waxman, "Adapting the Law of Armed Conflict to Autonomous Weapon Systems", **International Law Studies Series**, US Naval War College, Vol. 90, 2014. pp. 385-411.
[426] Jack M. Beard, pp. 637-638.

weapon systems is another important issue.[427] *Markus Wagner* remarks that the exact definition of the principle of proportionality is still under debate. If proportionality is concerned, only a human can give the right decision and thereby determine quantitative and qualitative condition. AWS's can be programmed with quantitative conditions and be good at making quantitative calculation. *Wagner* emphasizes "humans are better adapted to making these types of decisions which are by nature subjective." AWS's may encounter countless situations as to the principles of proportionality. AWS's are limited with only using their algorithm to respond to countless subjective circumstances. *Kelly Cass* states that "no computer system can adequately decipher whether an attack is proportionate. Likewise, it is doubtful that programmers will be able to pre-program autonomous weapons with a specific response for each of the situations that arise during warfare".[428]

One of the core principles of discrimination is the distinction between the civilians and combatants. According to ICJ advisory jurisdiction as to nuclear weapons, the principle of discrimination in conflicts is one the cardinal principles of the LOAC.[429] *ICJ* also noted "[s]tates must never make civilians the object of attack and must consequently never use weapons that are incapable of distinguishing between civilian and military targets." Indeed, a weapon can be unintentionally harmful for civilians. The core issue is whether a weapon has discrimination capability between civilians and combatants, or not.[430] LOAC prohibits indiscriminate weapons that cannot distinguish between civilian objects and military objects. The weapons, which are naturally indiscriminate, are illegitimate according to LOAC. For instance, the Scud missile is an indiscriminate ballistic missile system used in the First Gulf War; they caused loss of civilians because of the lack of inaccurate guidance

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[427] Kelly Cass, p. 1037.
[428] Kelly Cass, p. 1037.
[429] Gökhan GÜNEYSU, "Otonom Silah Sistemleri ve İnsancıl Hukuk", **Türkiye Barolar Birliği Dergisi**, Vol. 108, 2013, pp. 259-272.
[430] Jack M. Beard, p. 637.

system.[431] The current autonomous weapon systems are unable to distinguish between civilian objects and military targets. The lack of technological development is the main reason for this issue. The existing technology can discriminate between only a car and a human. In the complicated circumstances, AWS's will have to distinguish faces of the human beings. Moreover, there is no database includes all images of the enemy combatants' faces.

Despite their limitations, *Professors Kenneth Anderson and Matthew Waxman* state that with the development of military technology, the autonomous weapon system can be used against enemy combatants and other autonomous systems without possible loss of civilians. For instance, Navy's MK 60 Encapsulated Torpedo (CAPTOR) uses an acoustic detection system to differentiate between hostile and friendly submarines. This system can be deployed for undersea attacks against enemy objects.[432]

Magnus Wagner gives particular examples of the AWS; a child is forced to carry or transport weapons in the armed conflicts (For instance, there are significant numbers of children soldiers forced to join rebel groups in Africa). For a flying AWS at the low level, this child looks like a combatant. The preprogrammed AWS can launch an attack on a child. Moreover, the religious, traditional and cultural factors are also another problem for AWS's. AWS system should calculate all factors and determine the parameters before the attack. *Wagner* states that "[t]he requirements for this capability are especially demanding because human lives are at stake."[433]

LOAC may potentially prohibit the use of unlimited and unnecessary force by AWS. Nonetheless, the potential use of AWS can be deployed as non-lethal, non-kinetic force, and electronic attack weapon systems. So long as the possible use of the autonomous weapon systems complies with the principles

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[431] Michael N. Schmitt, "Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics", **Harvard Law School National Security Journal Features**, February 2013, p. 10.
[432] Kelly Cass, p. 1036.
[433] Markus Wagner, pp. 113-114.

of military necessity, the use of AWS will be legal concerning the principle of military necessity.[434]

Finally, the legal responsibility for the use of AWS is another issue. The separation of the human from the decision-making processes of the final phase of the attack should be considered in terms of legal responsibility. In the systems of human-in-loop and human-on-loop, the human controller has legal responsibility for the decision. However, due to lacking of the distinction between civilian and combatant, AWS is no charge of its illegal actions.[435]

4.1.3. Nanotechnology

Nanotechnology is one of the most prominent disciplines of futuristic technologies. Furthermore, the field of nanotechnology reached the level of $4 billion volume of trade in 2005. The United States, China, the United Kingdom, Japan, Sweden, Israel, Taiwan, Iran, Russia, and India have invested in their research for their potential useful areas in the future conflicts.[436]

William Boothby defines the nanotechnology as "Nanotechnology is based on the notion of a nanometer, one billionth of a meter. Substances are ground down to tiny sub-particles and are then built up again, thus changing the characteristics of the material in potentially useful ways. Substances may, for example, be reduced in weight and increased in durability and strength, thus perhaps yielding protective or offensive benefits."[437] *Hitoshi Nasu* adds "In fact, the use of nanotechnology enable, the increased and tailored rate of energy release, manipulation of optical properties, increased electrical conductivity, and improved hardness and strength with reduced weight, which can find useful applications for advanced military equipment and

[434] Kelly Cass, p. 1034.
[435] Jeffrey S. Thurnher, p. 225.
[436] Lucas Drayton Bradley, "Regulating Weaponized Nanotechnology: How the International Criminal Court Offers a Way Forward", **Georgia Journal of International & Comparative Law**, Spring 2013, Vol. 41, no. 3, p723-745, pp. 723-746.
[437] William H. Boothby, 2014, p. 182.

weaponry."[438] Therefore, nanotechnology has substantial potential applications for the military in armed conflicts. *Thomas Faunce and Hitoshi Nasu* give instances of military applications of nanotechnology as follows:

> *lighter, stronger and more heat-resistant armour and clothing, bio /chemical sensors, lighter and more durable vehicles, miniaturization of communication devices, conventional missiles with reduced mass and enhanced speed, small metal-less weapons made of nanofibre composites, small missiles and artillery shells with enhanced accuracy guided by inertial navigation systems, and armour-piercing projectiles with increased penetration capability.*[439]

Nanotechnology has many advantages concerning military applications; nanotechnology may cause unpredictable consequences among which could be harmful effects on the human body and the environment. Nanorobots may cause disaster thereby uncontrollable and consistent duplication of nanorobots. Moreover, nanotechnology may be deployed as a biological weapon of mass destruction.[440] In addition to this, nanotechnology may be used to eliminate or disrupt the immune system and vitals of the human body. Nanorobots may also be used to evade vaccinations that protect humans or animals against the diseases.[441] Bradley gives the case of the Dense Inert Metal Explosive (DIME), which was developed and deployed by the Israeli Army. DIME is a kind of munition creates micron size of intensively heat fragmentation. Regarding nanotechnology, the munition designer can produce these types of munitions that are designed for scattering microparticles of fragmentation. The microparticles of fragmentation may cause severe and incurable wounds because it is nearly impossible for doctors to remove them from the human body. According to studies, nanoparticles settle in the lungs and cause

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[438] Hitoshi Nasu, "Nanotechnology and the Law of Armed Conflict", **New Technologies and the Law of Armed Conflict**, (Ed. Hitoshi Nasu, Robert McLaughlin), Asser Press, The Hague, 2014, p. 144.

[439] Thomas Faunce and Hitoshi Nasu, "Nanotechnology and the International Law of Weaponry: Towards International Regulation of Nano-Weapons", **Journal of Law, Information and Science**, Vol. 20, no. 2009/2010, (2009-2010), pp. 21-54.

[440] Lucas Drayton Bradley, p. 724.

[441] Margaret E. Kosal, "Anticipating the Biological Proliferation Threat of Nanotechnology: Challenges for International Arms Control Regimes", **New Technologies and the Law of Armed Conflict,** (Ed. Hitoshi Nasu, Robert McLaughlin), Asser Press, The Hague, 2014, pp. 164-166.

suffocation, in which body cannot break down the particles because of their unique structure and micro size.[442]

Concerning environmental effect, the applications of nanotechnology weapons may damage the environment, or remnants of nanoparticles of the weapon that may permanently endanger lives of humans after the explosion, or intended or unintended remains of the weapons. In the circumstance of environmental effects, the use of such weapon should be assessed as the breach of API as to the provision of widespread, long-term and severe damage.[443]

As discussed above, nanotechnology weapons may bring about substantially destructive and terrifying unforeseen consequences. The possible application of these weapons may incline to violate the principles of LOAC. So, both international community and governments need to find practical legal solutions based on the law of the armed conflict to prevent potential future violations.[444]

In the case of the compatibility of new technology and current the law of the armed conflict, the new military technology is subject to the core principle of the armed conflict as "in any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited." The choice of weapons or means of war is restricted to the principle of the prohibition of unnecessary suffering and superfluous injury, the principle of the discrimination of the civilian and combatant and, the principle of the ban to cause widespread, long-term and severe damage to the natural environment.[445]

In the above given example of the DIME munition, Israel deployed them in the Gaza Operations in which the effects of DIME on the human body is considered the violation of the LOAC because of the unique specifications of DIME."[446] Although there is no binding document of nanotechnology in the law of weaponry, similar to DIME example, in the case of injuries using fragments that escape detection in the human body using X-rays, the

[442] Lucas Drayton Bradley, pp. 728-729.
[443] William H. Boothby, 2014, p. 183.
[444] Lucas Drayton Bradley, p. 724.
[445] Hitoshi Nasu, "Nanotechnology and the Future of the Law of Weaponry", **US Naval War College International Law Studies**, Vol. 91, 2015, pp. 486-516.
[446] Lucas Drayton Bradley, p. 738.

nanotechnology weapon is considered to the breach of the Protocol 1 of the Conventional Weapons Convention.[447] Similar to DIME, nano-weapons could also be intrinsically illegal in light of the general principles against superfluous injury or unnecessary suffering. However, nanotechnology contributes to the development of more enhance weapons. Enhanced nanotech weapons will be more accurate and precise in order to decrease the loss of civilians.[448]

Lucas Drayton Bradley emphasizes that nanotechnology brings innovation to fields of medicine, increased durable goods and, and industrial area in the near future. As mentioned above, nanotechnology may also cause unpredictable and adverse effects on humans and the environment. The existing law of the armed conflict remains incapable of preventing any potential, harmful and indiscriminate use of nanotechnology in the war. The Chemical Weapons Convention and the Biological Weapons Convention are unable to the regulation the possible use of replicable nanorobots in the damaging human body, causing diseases and suffocating victims. Furthermore, the current international judicial system is unprepared to hold a decision on the misuse of nanotechnology. Consequently, the definition of the condemning use of nanotech weapons should be considered based on the law of weaponry before unrestrainable and unprecedented devastating effects of nanotechnology.[449]

4.1.4. Cyber Warfare

Nowadays, states, people, and armies are much more dependent upon information and communication technology in their daily life and activities. Although the digital information and communication technology provide enormous benefits and facilities to our lives, the technology has also brought about many threats and vulnerabilities. Due to the dependency on cyber

[447] William H. Boothby, 2014, p. 184.
[448] Thomas Faunce and Hitoshi Nasu, p. 47.
[449] Lucas Drayton Bradley, pp. 744-745.

technology, the states give priority to cyber security. The states may probably be more subject to cyber war than the conventional war.[450]

William H. Boothby defines the term of the 'Cyber' and 'Cyberspace' as follows:

> *'Cyber'; denotes a relationship with information technology, while 'cyberspace' is the environment formed by physical and non-physical components characterized by the use of computers and the electromagnetic spectrum to store, modify and exchange data using computer networks. As a result, cyber operations consist of the employment of cyber capabilities with the primary purpose of achieving objectives in or by the use of cyberspace.*[451]

In addition to that, the term 'cyber-attack' denotes a kind of detrimental activity include to degrade, deny, disrupt or destroy software and hardware in computers. Cyber-attacks taking place in the cyberspace can damage not only computer hardware and software but also telecommunication systems, industrial facilities, electronic materials and the daily life of societies.[452]

Estimating the exact consequences of a cyber-attack is very difficult. However, if cyber-attacks can penetrate an air-traffic control system, the accidents will become unavoidable due to the uncontrolled air traffic. Moreover, a cyber-attack can damage the operation system of the nuclear facility and can cause a nuclear disaster. Besides the physical harm, cyber-attacks can crash official websites and the attacker can destroy or access personal details or secret official documents.[453]

For instances, about 3000 Chinese hackers carried out a cyber-attack on Indonesian government sites to protest anti-Chinese riots in the country, including computer networks of defense ministries, banks, the media. Another famous cyber-attack occurred against the government's websites of Estonia. Moreover, Estonia's biggest bank and several newspapers were almost

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[450] Nicholas Tsagourias and Russell Buchan, "Cyber War and International Law", **Journal of Conflict & Security Law**, Vol. 17, no. 2, 2012, pp. 183-186.
[451] Boothby, 2014, p. 123.
[452] Nicholas Tsagourias, "Cyber-attacks, self-defense and the problem of attribution", **Journal of Conflict and Security Law,** Vol. 17, no. 2, Summer 2012, pp. 229-244.
[453] Russell Buchan, "Cyber Attacks: Unlawful Uses of Force or Prohibited Interventions?", **Journal of Conflict and Security Law,** Vol. 17, no. 2, Summer 2012, pp. 212-227.

closed.[454] The cyber-attacks coordinated by Russian hackers lasted about three weeks. Estonia accused the Russian government to back attackers up. However, the Russia denied the accusation of the responsibility of the attacks.[455] Estonia received the help to the investigation of the cyber-attack from NATO, the EU, the USA and Israel. According to evidence of the investigation, the attacks were initiated from Russian IP addresses. Consequently, The Estonian Cyber Attack raised awareness in the NATO. The NATO established an Internet International Military Organization in Estonia which is called the Cooperative Cyber Defense Centre of Excellence (CCDCOE).[456]

In 2010, Iran government claimed that Natanz nuclear plant was subject to cyber-attack through computer virus known as Stuxnet.[457] Stuxnet was designed to damage nuclear enrichment centrifuges by excessive speed while computers send false status data to technicians, the technicians assumed that the centrifuges were operating normally. [458] The Stuxnet malware is created by experts the USA with assistance from Israel and scientists at Siemens. The officials in Israel and the USA claimed that Iran's nuclear program had been delayed at least two years. Except Iran, Stuxnet worm affected computers in other countries including India, Indonesia and Russia. *Mary Ellen O'Connell* emphasizes, "Stuxnet is the first-known worm designed to target real-world infrastructures such as power stations, water plants, and industrial units."[459]

The first cyber-attack in the armed conflict occurred during the Russian-Georgian war of August 2008. Some Georgian Government websites were externally controlled by the Russian hackers. The Georgian government could not correctly inform international media about the course of the conflict. Moreover, the websites were directed other alternative news

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[454] Mary Ellen O'Connell, "Cyber Security without Cyber War**", Journal of Conflict and Security Law,** Vol. 17, no. 2, Summer 2012, pp. 187-209.
[455] Russell Buchan, p. 214.
[456] Mary Ellen O'Connell, p. 192.
[457] Russell Buchan, p. 219.
[458] Michael Newton, "Proportionality and Precautions in Cyber War", **International Humanitarian Law and the Changing Technology of War**", (Ed. Dan Saxon), Martinus Nijhoff Publishers, Boston, 2013, p.147.
[459] Mary Ellen O'Connell, p. 192.

services in favor of the Russian position. However, the Russian government disclaimed backing of the cyber-attack. The Russia abdicated the responsibility to private Russian citizens.[460]

According to the Ha'Aretz news, on December 2011, the Iranian electronic warfare specialists downed and captured the top-secret RQ-170 Sentinel drone in Iran while the drone was on the surveillance mission over the Afghanistan. The Iranian electronic warfare specialists carried out this operation through interruption of communication between the drone and its operators. After that, the misguided US drone was directed to the Iranian airspace via reconfigured GPS. The US officials reclaimed the captured drones from Iran.[461]

The last instance of the cyber-attack was related to air strike of the Israel Air Force in September 2007. Although the cyber-attack has not been officially confirmed, the Israel Air Force carried out an air raid on the suspicious nuclear facility under construction in the north of the Syria. During the air strike, the Israel Air Force blinded Syrian air-defense radar through the cyber-attack to avoid any detection and to reach to target safely.[462]

Russell Buchan emphasizes that; in the circumstances of the physical damage through cyber-attack, the cyber-attack violates the Article 2(4) concerning the prohibition of the threat and use of force by states. During the cyber-attack against Iran nuclear facility in 2010, the Stuxnet virus damaged the centrifuges of the Iranian nuclear enrichment facility. This attack can be evaluated as a breach of the Article 2(4). In the case of no physical damage, the cyber-attack does not violate Article 2(4).[463]

David Turns mentions that there is no official definition of the terms of 'cyber war' or 'cyber-attack' and regulatory binding documents in the treaty,

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[460] David Turns, "Cyber War and the Concept of Attack in International Humanitarian Law", **International Humanitarian Law and the Changing Technology of War**", (Ed. Dan Saxon), Martinus Nijhoff Publishers, Boston, 2013, pp. 225-226.
[461] "Iran Official: We Tricked the US Surveillance Drone to Land Intact." **Haaretz.com**. 15.12. 2011. http://www.haaretz.com/middle-east-news/iran-official-we-tricked-the-u-s-surveillance-drone-to-land-intact-1.401641, (10.06.2016).
[462] David Turns, p. 214.
[463] Russell Buchan, p. 227.

any case law, and customary international law.[464] Particularly, the Estonia incident raised the concerns of the cyber-attacks against governments about the Jus ad Bellum doctrine. Therefore, the cyber-attack on the Estonia can be considered as, a self-defense based on the North Atlantic Treaty's Article 5 and under the United Nations Charter provision in the Article 51 appertaining to the collective self-defense.[465] Furthermore, *Yoram Dinstein* emphasizes that:

> *The term 'attacks' is defined in Article 49(1) of the Protocol as 'acts of violence against the adversary, whether in offence or in defence'. Any act of violence fits this matrix: not only massive air attacks or artillery barrages, but also small-scale attacks (like a sniper firing a single bullet). The violence must be understood in terms of the consequences of the act rather than the act itself; hence, violent acts may include cyber (computer network) attacks leading to mayhem and destruction.*[466]

On the other hand, *Mary Ellen O'Connell* states that the cyber war concerning the international law of self-defense is irrelevant and exaggerated. The cyber war is more relevant for the law of communications and economic activities rather than the international law on the use of force.[467]

The customary principles of the law of conflict are binding to the cyber war. Moreover, the party states are prohibited to choose unlimited methods or means of cyber war and to employ means and methods of cyber warfare of a nature to cause superfluous injury or unnecessary suffering. Furthermore, the cyber war must be assessed under the Article 36 of the Additional Protocol I. Another customary principle of the law of weaponry related to cyber warfare is the prohibition of indiscriminate weapons by nature. The belligerents should avoid causing unrestrained and widespread effects of worms, viruses, and other malware. Because the cyber weapons cause damage to civilian computer systems such as individual, hospital, power stations, civilian air traffic controls, etc., the executor of cyber-attack should consider the discrimination between

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[464] David Turns, "Cyber War and the Concept of 'Attack' in International Humanitarian Law", **New Technologies and the Law of Armed Conflict,** (Ed. Hitoshi Nasu, Robert McLaughlin), Asser Press, The Hague, 2014, p. 211.
[465] Mary Ellen O'Connell, p. 192.
[466] Yoram Dinstein, 2004, p. 84.
[467] Mary Ellen O'Connell, p. 199.

the civilian and military objects. Otherwise, the action will be unlawful.[468] If a state comes continually under cyber-attack, it can carry out countermeasures to defeat attacks providing that they oblige to the principles of proportionality and military necessity.[469] As it can be remembered that, the Stuxnet malware infected the Iranian nuclear facility computers also caused minor damages to over 40% of the computers of other countries.[470]

Finally, *William H. Boothby* remarks that cyber-attacks are prohibited to cause widespread, long-term and severe damage to the natural environment under the Article 35(3) of the Additional Protocol I.[471]

4.2. THE LAW OF WEAPONRY AND THE IMPLICATIONS OF AIR FORCE

The law of weaponry is a part of the law of armed conflict. The law of weaponry regulates the norms and conducts of states and belligerents in the armed conflicts. As mentioned above, international law of armed conflict has developed and tried to catch contemporary norms to fulfill current requirements. Conventions, Declarations and international agreements as sources of the LOAC aim to restrict the damage and suffering of combatants and civilians during armed conflicts.[472] Air operations have been the most preferred means and method of warfare in today's armed conflicts because of their technological, political, military strategic and tactic advantages. However, the current situation of the air force brings responsibility for the planner and executor of the air strikes concerning the international humanitarian law and political consequences.

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[468] William H. Boothby, "Where Do Cyber Hostilities Fit in the International Law Maze?", **New Technologies and the Law of Armed Conflict,** (Ed. Hitoshi Nasu, Robert McLaughlin), Asser Press, The Hague, 2014, pp. 68-69.
[469] Russell Buchan, p. 226.
[470] Mary Ellen O'Connell, p. 202.
[471] William H. Boothby, 2014, p. 69.
[472] Matthew C. Waxman, "**International Law and the Politics of Urban Air Operations**", RAND Corporation, Washington D.C. 2000, pp. 5-6.

4.2.1. Implications of the Law of Weaponry in the Humanitarian Law

The above-mentioned fundamental principles of the law of armed conflict are classified as the military necessity, proportionality, distinction and unnecessary suffering. In this section, the implication of the air force under the law of the armed conflict will be assessed in consideration of these basic tenets of the LOAC. Briefly, the principle of military necessity is the legitimation of the use of force to achieve required military objectives. Together with other fundamental principles of the LOAC, military necessity does not violate them.

4.2.1.1. The Obligations In Terms of the Principles of the Law of Weaponry

The belligerent does not conduct unlimited military operations according to the principle of the military necessity. The planner or commander of the military operation should determine exact military necessity prior to air strike.[473] According to military necessity, they should consider minimizing the possible loss of civilians, private property and, even combatants during the level of planning and execution.[474]

The military objectives are defined such as military personnel and vehicles, military bases and training facilities, military communication systems, fuel storage and distribution, shelters, ammunition storage areas, military command and control infrastructure, airfields, military aircraft, warships, weapons, munitions, military operation centers, industrial infrastructure, and political targets as to government agencies.[475]

The principle of proportionality is about the consideration of the implications of the military operation between the achievement of military

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[473] Kirk L. Davies, Eric M. Johnson, Laura C. Desi, Sam C. Kidd and Thomasa T. Paul, **"Air Force Operations and the Law"**, Judge Advocate General's School, Alabama, Third Edition, 2014, p. 13.

[474] Michael N. Schmitt and Eric W. Widmar, "On Target": Precision and Balance in the Contemporary Law of Targeting", **Journal of National Security Law and Policy**, Vol. 7, no. 3, 2014, p. 409.

[475] Leslie C. Green, p. 196.

objectives and predictable loss of the civilians. The commander or planner of the air strikes should consider the foreseeable consequences of the loss and injury of civilians and civilians' properties to achieve military objectives. For example, in a case of deployment of a single enemy sniper at a roof of a hospital, the planner or executive of air strike should consider the principle of proportionality. As a result, the air raid will not be the reasonable option to gain military advantage.[476]

The principle of distinction or discrimination is the tenet of distinguishing between combatants and civilians by belligerents. Moreover, the civilians should not participate directly in military actions.[477] The belligerents should consider the principle of distinction between civilians and combatants and civilian objects and military objectives at all times.[478] On the other hand, the principle of discrimination also encompasses the use of indiscriminate weapons and the use of weapons indiscriminately during the air raids.[479] As it can be remembered that one of the justifications of the persecutor v. Tadic case is the indiscriminate attack on Kosarac Town in Bosnia. ICTY sentenced Dusko Tadic to twenty years sentence thereby its judgment based on serious violations of the LOAC on basis of violations of the provisions of the Geneva Conventions and principles of customary law.[480]

One of the core principles of the international humanitarian law is the superfluous injury or unnecessary suffering. The principle forbids the weapons deliberately causing unnecessary suffering and superfluous injury, which is codified in the Article 23 of the Hague IV.[481] The Hague Convention IV of 1907 remarks that "the right of belligerents to adopt means of injuring the enemy is not unlimited." Moreover, the Article 35(2) of the Additional Protocol I prohibits the employment of weapons calculated or of a nature to

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[476] Matthew C. Waxman, pp. 8-9.
[477] Kirk L. Davies, pp. 14-15.
[478] Christopher Greenwood, Current Issues in the Law of Armed Conflict: Weapons, Targets and International Criminal Liability, **Singapore Journal of International & Comparative Law**, No. 1, 1997, p. 459.
[479] Christopher J. Markham, Michael N. Schmitt, "Precision Air Warfare and the Law of Armed Conflict", **International Law Studies**, Vol. 89, 2013, p. 680.
[480] Judgment, **Tadic Case** (IT-94-1-AR72 ICTY), Appeals Chamber, 2 Oct.1995,
[481] Kirk L. Davies, p. 14.

cause superfluous injury or unnecessary suffering.[482] For instance, in a case of the projectiles containing poisoned fragments, the wounded person cannot be cured and will die with suffering and pain.

4.2.1.2. The Examples of Case and Report

The following cases clarify the law of weaponry appertaining to the applications of the air forces. First of all, the case of Isayeva v. Russia is an important case to clarify the issue.[483] The Russian Air Force carried out air strikes to the Chechen village of Katyr-Yurt with general-purpose bombs FAB-250 and FAB-500[484] in February 2000. These bombs had the capability of a damage radius exceeding 1,000 meters through the blast and fragmentation effects. Forty-six civilians were killed, and fifty-three civilians were wounded because of the air strike. According to the European Court of Human Rights-ECHR, the use of these kinds of indiscriminate weapons in the populated area without evacuation of the civilians in conflicts is against the basic values and principles of a democratic society.[485] Furthermore, the ECHR emphasizes the principles of military necessity and proportionality that "any use of force must be no more than "absolutely necessary" for the achievement of one or more of the purposes…". The use of force must be strictly proportionate to the achievement of the targeted aims. Moreover, the ECHR also allocates the responsibility to authorities to take necessary precautions in order to minimize the risk of loss of civilian life in the operations. The final adjudication of the case of Isayeva v. Russia, the Russia is ordered by the court to pay indemnification to the applicants by ECHR.[486]

The court also underscores that;

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[482] Michael N. Schmitt and Eric W. Widmar, p. 397.
[483] European Court of Human Rights-ECHR, "**The case of Isayeva v. Russia**", the application no. 57950/00, 15, 4, 24.02.2005.
[484] **FAB-250 and FAB-500** are Russian made, general purpose, unguided, air-dropped bombs.
[485] Maya Brehm, "The Human Cost of Bombing Cities", **Sur-International Journal On Human Rights**, Vol. 12, no. 22, December 2015, p. 70.
[486] European Court of Human Rights-ECHR, "**The case of Isayeva v. Russia**", the application no. 57950/00, 15, 4, 24.02.2005.
http://hudoc.echr.coe.int/eng?i=001-68381, (27.06.2016).

the population of the village had been held hostage by a large group of well-equipped and well-trained fighters, the primary aim of the operation should be to protect lives from unlawful violence. The massive use of indiscriminate weapons stands in flagrant contrast with this aim and cannot be considered compatible with the standard of care prerequisite to an operation of this kind involving the use of lethal force by State agents.

Another binding judgment example is the judgment of the Case of the Santa Domingo Massacre v. Colombia in which the Inter-American Court of Human Rights (IACHAR) appertaining to the use of cluster munitions by Colombian Air Force against the village of the Santa Domingo in 1998. The Colombian Air Force carried out air strikes against Colombian Revolutionary Armed Forces (FARC). The attack caused the death of 17 and wounded 27 civilians. Colombia argued in the court that the FARC guerrillas had used the civilian population as a shield and exploded a car bomb that caused the deaths of civilians. Colombia alleged that the death of the civilians occurred because of the FARC car bomb. According to the conducted investigation, the Colombian Air Force caused the loss of civilians' life and the property of the village residents. To sum up, the IACHAR conducted the case based on fundamental principles of the Law of Armed Conflict (LOAC) as to the law of the conflict. Moreover, the court referred to the principles of proportionality and discrimination. The court underlined the indiscriminate features of the AN-M1A2 cluster bomb.[487] In addition, the use of these kinds of indiscriminate weapons is dangerous, and the planner or executor of air strike should consider the potential loss of civilians prior to attack of the military objective. Consequently, the Colombian Air Force was condemned by the court to pay compensation to victims.[488]

After the Second Lebanon War, the UN Human Rights Council established an independent commission of the inquiry of alleged violations of Law of Armed Conflict (LOAC) involving the Israel Defense Forces (IDF). During the conflict, the Israeli Air Force carried out some 15,500 air raids to

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[487] **AN-M1A2 cluster bomb** contains unguided six submunitions.

[488] Inter-American Court of Human Rights, "**the Case of the Santa Domingo Massacre v. Colombia**", Case N. 12.416, 30 November 2012. http://www.corteidh.or.cr/docs/casos/articulos/seriec_259_ing.pdf, (28.06.2016).

engage more than 7000 military targets in the Lebanon. The commission investigated more than twenty of these strikes as to the violation of LOAC. According to the commission report, the attacks had "characteristics of the excessive, indiscriminate and disproportionate use of force by IDF against Lebanese civilians and civilian objects."[489] The Article 25 also underscores that;

> *None of the weapons known to have been used by IDF are illegal per se under international humanitarian law. However, the way in which the weapons were used in some cases transgresses the law. The Commission addressed more specifically the use of cluster munitions, 90 per cent of which were fired by IDF during the last 72 hours of the conflict. The Commission finds that their use was excessive and not justified by any reason of military necessity. The Commission finds that these weapons were used deliberately to turn large areas of fertile agricultural land into "no go" areas for the civilian population. Furthermore, in view of the foreseeable high dud rate, their use amounted to a de facto scattering of anti-personnel mines across wide tracts of Lebanese land. The presence of unexploded ordnance continues to act as a major impediment to the return of IDPs and refugees, as well as threatening the lives and livelihoods of those who have chosen to return. While the use of depleted uranium munitions could not be confirmed, the Commission received a number of reports regarding the use of phosphorous weapons.*[490]

The most significant example of the law of weaponry is the case of the Prosecutor v. Martic.[491] The International Criminal Tribunal for the former Yugoslavia (ICTY) had the option to adjudicate upon on the unlawful use of cluster bombs, violations of the military targeting rule, indiscriminate attacks and, the targeting of cultural properties. Milan Martic was a senior rebel commander of Serbian forces during the breakup of Yugoslavia. He ordered to the shelling of Skabrnja and Nadin villages in Croatia in November 1991 and, the rocket strikes on Zagreb on 2 and 3 May 1995. As a result of the strike on Skabrnja and Nadin, many historic churches, schools, hospitals and, civilian properties were destroyed and most importantly 68 civilians were killed and

[489] James G. Stewart, "The UN Commission of Inquiry on Lebanon-A Legal Appraisal", **the Journal of International Criminal Justice**, Vol. 5, no. 5, 2007, p. 1044.

[490] UN Human Rights Council, "**Report of the Commission of Inquiry on Lebanon Pursuant to Human Rights Council Resolution**", S-2/1, 23 November 2006, A/HRC/3/2. http://www.refworld.org/docid/45c30b6e0.html, (28.06 2016).

[491] Judgement, **Milan Martic Case** (IT-95-11-A ICTY), Appeals Chamber, 8 October 2008.

many more injured.[492] Especially, concerning the Zagreb attacks, the Tribunal affirmed that M-87 Orkan multiple rocket launcher system has indiscriminate characteristics because of its non-guided cluster warhead[493] in which the weapon is incapable of precision guided system, and it can disperse unguided cluster submunitions.[494] The tribunal decision in Martic case[495] was the first illustration to convict an individual criminal responsibility for violations of the law of armed conflict on several counts of war crimes. However, the decision also justified a war crime, if a war crime is a serious violation of the humanitarian law, not only in the international armed conflicts but also in non-international armed conflicts.[496] According to the decision of the Tribunal Court, Milan Martic deliberately committed war crime with indiscriminate attacks on civilians. Although Milan Martic knew the indiscriminate characteristics of the M-87 Orkan system, he carried out the attacks on the civilian population of Zagreb. These attacks resulted in many deaths and serious injury of the civilian population. Milan Martic was sentenced thirty-five (35) years of imprisonment by ICTY.[497]

4.2.1.3. Implications

Apart from the fundamental principles of the humanitarian law, the air strikes are also forbidden against dams and nuclear power plants in that the destruction of these objectives may cause devastating effects on civilian population and the environment. However, if the destructive effects are not affecting the civilian population, such military targets may be attacked.[498]

The planner and executor of the air campaigns must take "feasible precautions" to care civilians and civilian objects before and during a strike. In

[492] Gary. D. Solis, p. 595.
[493] Gro Nystuen, p. 100.
[494] Gary. D. Solis, p. 597.
[495] Judgement, Milan Martic (IT-95-11-A ICTY), Appeals Chamber, 8 October 2008
[496] Christopher Greenwood, Current Issues in the Law of Armed Conflict: Weapons, Targets and International Criminal Liability, **Singapore Journal of International & Comparative Law**, No. 1, 1997, pp. 441-467.
[497] Gary D. Solis, p. 597.
[498] Leslie C. Green, p. 197.

terms of "feasible precautions", the precision of the weapons affect the applications of the law of the armed conflict.[499] The new ammunition technology has rapidly developed and provided new opportunities to planner or executor of a military operation. New generation precision-guided munitions have the capability to hit targets accurately. Thus, the increased accurate strike ability of the air forces has provided more liability to consider the targeting law as to the discrimination.[500] The planners and executor of the air raid must consider the balance between achievement of the mission and the minimum risk of the collateral damage and civilian injury in the urban area.[501]

The planner and executor of the air strike can select feasible weapons and tactics for minimizing the loss of civilian life and property. The precision weapons ensure the greater accurate hit and lesser damage by an explosion. Such circumstances provide advantages if the attack causes harm to civilians and civilian property. When the air strike on several military targets with similar military advantage is at stake, the planner of air campaign must prefer the military objective involving the lesser danger to civilian lives and properties.[502]

Finally, many of weapon as mentioned above systems are prohibited and restricted to be used, produced, and distributed by treaties and conventions. These weapon systems are explosive and expanding bullets, chemical and biological weapons, booby-traps and anti-personnel land mines, blinding lasers, incendiary weapons, naval mines, torpedoes, and cluster munitions. The belligerent states and their planner of the attack must consider the prohibited weapons before and during the air campaigns.[503]

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499 Christopher J. Markham, p. 685.
500 Matthew C. Waxman, pp. 12-13.
501 Christopher J. Markham, p. 686.
502 Christopher J. Markham, pp. 687-688.
503 Michael N. Schmitt and Eric W. Widmar, pp. 399-400.

4.2.2. Implications of the Law of Weaponry on International Politics

The public opinion and the political pressure have effects on acting sensitively during the military operations because of the loss of friendly casualties and civilian loss. For instance, a US Air Force aircraft carried out air campaigns above 15,000 feet to minimize risks to aircrews with the concerns of the loss of the US personnel. The implications of international politics as to the law of weaponry stem from the international community, the domestic public restraints, and the local residents in the conflict territory.[504]

4.2.2.1. Vietnam War

Initially, the implications of international politics of the law of weaponry should be considered from the historical perspective. For instance, during the Vietnam War, the US and South Vietnamese forces carried out indiscriminate airstrikes.[505] In addition, as known, the 'napalm girl' incident was one of the breaking points of the Vietnam War. Nine-year-old Phan Thi Kim Phuc was photographed as naked and burned because of the strikes of the napalm bomb.[506] With the photograph issued through the media, the American public opinion took a stand against the Vietnam War policy of the United States. The public pressure was the influence on the alteration of the US foreign policy in the Vietnam conflict.[507]

Moreover, the famous photojournalist Jones-Griffiths documented the side of brutality, merciless and unlawfulness of the significantly dramatic incidents of the Vietnam War. Many people become permanently disabled because of the indiscriminate attacks and many people, animals and, plants were harmed by the use of deforestation agent orange. His photography

[504] Matthew C. Waxman, p. 25.
[505] Matthew C. Waxman, pp. 28-29.
[506] Angie Lovelace, pp. 35-45.
[507] W. Joseph Campbell, "Picture Power? Confronting the Myths of 'Napalm Girl'", **American Journalism Historians Association**, 34th Annual AJHA Convention, Oklahoma City, October 2015.

workings on the Vietnam War influenced the US citizens towards an antiwar perspective. Jones-Griffiths was the one the crucial factor in the alteration of the Foreign Policy of the United States.[508]

4.2.2.2. First Gulf War

During the First Gulf War, the air strike on the Al Fidros Bunker was an important case as to the military targeting rule and its implications. According to misevaluation of the intelligence reports and the satellite image, the Al Firdos bunker in Baghdad was used by the Iraqi Republican Guards. On the contrary, the bunker was also used by civilians as a shelter. Eventually, hundreds of civilians were killed because of the air strike. The incident was broadcasted to the world by the CNN. Thus, this incident jeopardized the loyalty of the Arab members of the Coalition. The US decided to suspend air raids on the Baghdad for ten days because of the political crises. The next air strikes would be carried out with strict political control and, approval of the Washington.[509] Furthermore, after the First Gulf War, the US lost international support for their Iraq policy due to indiscriminate attacks on civilians by the US Air Force. For example, the Arab League criticized the cruise missile attack in January 1993 in which the missile aimed suspicious weapon-producing facility but hit a Baghdad hotel resulting in civilian deaths.[510]

4.2.2.3. Chinese Embassy Bombing

The Chinese Embassy Bombing event is another historical example as to the violation of the military targeting rule and the indiscriminate attack on the civilian targets. The allied air forces carried out an air raid on the Chinese

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[508] Philip Anthony Jones, "**Philip Jones-Griffiths Vietnam Inc. and Agent Orange: Collateral Damage Changing American Public Opinion towards the Vietnam War Through a Visual Narrative**". Academia.edu,

[509] Major William G. Adamson, "**The Effects of Real-time News Coverage on Military Decision-Making**", the Research Paper of the Research Department Air Command and Staff College, March 1997, pp. 17-18.

[510] Matthew C. Waxman, p. 30.

Embassy on 7 May 1999 because of the misconception by a few officials at the CIA. The US air force did not share any intelligence or information with the coalition partner before the attack. France and other coalition partners criticized the manner and conduct of the US due to the disregard for the operation procedures.[511] The relations between the US and China deteriorated because of the embassy bombing. The attack initiated protests and massive demonstrations against the US government in many Chinese cities. According to a former Chinese Ambassador, the strike was the test for Chinese strategic decision-making capability in crises.[512] Consequently, China began to carry out a skeptical foreign policy against the US including postponed US-China military relations and suspended negotiation on trade, arms control, and human rights issues after the bombing incident.[513]

4.2.2.4. Lebanon War 2006

The international community reacted to the indiscriminate and disproportionate use of cluster munitions by IDF negatively during 2006 Lebanon War. The strikes were also criticized by the UN Officials, Amnesty International, and Lebanese Prime Minister Office. They assessed that the cluster munitions killed and injured innocent people, which was "immoral and monstrous", "grave violations of international law" and, "a daily war crime."[514] According to the United Nations and human rights organizations, at least 26 civilians were killed because of unexploded cluster munitions. Approximately

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511 Steven Lee Myers, "Chinese Embassy Bombing: A Wide Net of Blame", **The New York Times,** 17 April 2000. http://www.nytimes.com/2000/04/17/world/chinese-embassy-bombing-a-wide-net-of-blame.html?pagewanted=all, (20.06.2016).

512 Jing Men and Your Devuyst, "The New Triangle of Power: China, the United States, and the European Union", (Ed. Sujian Guo, Baogang Guo), **Thirty Years of China-US Relations: Analytical Approaches and Contemporary Issues**", Lexington Books, United Kingdom, 2010, p. 301.

513 Danny Gittings, "China Rejects US Apology." **The Guardian**, 18.06.1999. http://www.theguardian.com/world/1999/jun/18/balkans4, (21.06.2016).

514 Bonnie Docherty, "The Time Is Now: A Historical Argument: for a Cluster Munitions Convention", **Harvard Human Rights Journal**, spring, 2007, Vol. 20, p. 53.

one million unexploded submunitions endanger civilians in Lebanon.[515] The unlawful use of cluster munitions also facilitated Hezbollah political propaganda. Hezbollah used the mosques and day care centers as weapons storage site and hideouts for its leaders. IDF carried out air strike towards these places; Hezbollah disclosed the loss of civilians to the press for the purpose of the propaganda. Hezbollah gained the sympathy of the Lebanon public and world public opinion.[516] A state can start a war in the case of Jus ad Bellum. However, if a state violates the rules of the Jus in Bello, the legality of the war may be discussed in international politics.

4.2.2.5. Implications

With the impressive development of the communication technology, people can reach the information and news rapidly. Besides the dissemination of information, the people can simultaneously share and record the images or videos of the live incidents. For instance, eyewitnesses of the violation of the law of armed conflict risk the course of the conflict. The combatants may commit breaches of the LOAC. The executive of the military operation can lose the public and ally support because of the sharing of the images of the events.[517]

Especially, most recent armed conflicts have taken place in urban areas such as Baghdad, Beirut, Belfast, Gaza City, Grozny, Kabul, Pristina and Sarajevo. The main issue is the determination of the discrimination between combatant and civilians. Most insurgent groups have been uninformed and used civilians to mask their existence and as shield to protect against attacks. *Alice Hills* emphasizes that under these circumstances, "[a]t best the presence of civilians encourages the media, non-governmental and intergovernmental

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[515] Richard Boudreaux, "Israel Criticized for Cluster Bombs", **Los Angeles Times**. 01.02 2008. http://articles.latimes.com/2008/feb/01/world/fg-cluster1, (14.04. 2016).

[516] Sarah E. Kreps, "The 2006 Lebanon War: Lessons Learned", **Parameters: US Army War College,** Vol. 37, no. 1, 2007, pp. 72-84.

[517] Bryan Frederick, David E. Johnson, "**The Continued Evolution of US Law of Armed Conflict Implementation Implications for the US Military**", RAND Publications, 2015, p. 82.

organizations (NGOs and IGOs) to pay overly critical attention to what the military do."[518] The successes of the urban conflict for modern armies depend upon well-organized and sensitively planned combat management as well as minimum collateral damage. Thus, the world opinion has been more sensitive as to the imposing of the humanitarian law during the armed conflicts.[519]

Consequently, the policy makers and the executors of the military operations should take into consideration of the sensitivity of public. They should consider the customary principles of the law of weaponry during the armed conflict. Otherwise, the given support by public and allied partners can be lost and the air campaign can be restricted because of the violation of the law of armed conflict.[520]

4.2.3. Humanitarian Impacts of Air Force Operations

Maya Brehm remarks that explosive weapons cause the death and injury of tens of thousands of civilians every year. Particularly, when the weapons are used in the urban regions, the weapons cause 90% of these direct casualties. Moreover, the weapons destroy the civilian properties, schools, hospitals, energy or power stations, water-distribution system, and other infrastructure. The damage of the utilities and properties that are vital for survival of the civilians, directly or indirectly, has significant challenges to civilians' economic, social and cultural life.[521]

The United Nations Institute for Disarmament Research (UNIDIR) published the report of the Humanitarian Impact of Cluster Munitions in 2008. The report is rather remarkable to understand better the negative effects of cluster munitions on human life. The humanitarian impact of cluster munitions

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[518] Alice Hills, "**Future War in Cities Rethinking a Liberal Dilemma**", Frank Cass Publishers, New York, 2004, p. 200.
[519] Alice Hills, p. 238.
[520] Matthew C. Waxman, pp. 41-42.
[521] Maya Brehm, p. 68.

is evaluated regarding physical and psychological impact, post-conflict relief and recovery, economic issues, demographic and social dynamics.[522]

The destruction of civilian properties causes not only material damages but also has long-lasting social impacts. Under such circumstances, people cannot live their daily lives and are forced to immigrate to survive.[523] Besides their social lives, unexploded ordnance (UXO) or ERW, especially submunitions, can be more dangerous and hurt more than antipersonnel mines to human body. Because of physical specification and explosive force, UXO has tendency to result in loss of upper limbs and blindness. On the contrary, anti-personnel mine can generally cause injuries to the lower limbs. Moreover, the threat of the UXO can also create anxiety and trauma on the communities. The psychological impact can negatively affect people's daily activities and their productivity.[524]

After the First Gulf War, the infrastructures of Iraq and Kuwait, such as electrical power stations, communications equipment, and bridges, could not be immediately returned to normal functions because of unexploded ordnances. Similarly, in Kosovo, unexploded submunitions hindered Kosovo people to access their farmland safely for cultivation because of an unapplied water project. Moreover, in Afghanistan, fruit gardens and vineyards have been contaminated with ERW. Even in Chad, the farmers have been hindered in accessing irrigation water requirement for agricultural productivity.[525]

According to the report of the Commission that established by the UN Human Rights Council, the Israel Air Force carried out air strikes on several medical centers and hospitals in Lebanon during the Second Lebanon War. Moreover, because of the attacks, one-half of the medical facilities were become unserviceable and one of the three hospitals in the conflict zone was

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[522] United Nations Institute for Disarmament Research (UNIDIR), "**The Humanitarian Impact of Cluster Munitions**", United Nations Publications, Geneva, Switzerland, 2008, p. 9.
[523] Maya Brehm, p. 71.
[524] United Nations Institute for Disarmament Research (UNIDIR), "**The Humanitarian Impact of Cluster Munitions**", United Nations Publications, Geneva, Switzerland, 2008, pp. 9-12.
[525] United Nations Institute for Disarmament Research (UNIDIR), "**The Humanitarian Impact of Cluster Munitions**", United Nations Publications, Geneva, Switzerland, 2008, p. 16-17.

severely damaged. Many wounded patients suffered from the indiscriminate Israel air raids.[526]

Regarding humanistic concerns, the United Nations estimates that there was approximately 500,000-ton unexploded ordnance (UXO) in Laos in 1996. The US air forces had struck from 1964 to 1973 with B52 strategic bombers. Only in 1995, the 66 UXO accidents happened in Laos. Most of the victims were children under the age of 15. Eventually, 14 people died, and 52 were injured. It may be remarked that 30 per cent of the UXO incidents were children playing with UXO.[527]

Similarly, in the first four weeks of Kosovo air raids, 150 Kosovans were killed and injured by unexploded ordnance. Moreover, 94 civilians were killed and more than 400 injured because of UXO accidents by June 2000. The official head of the United Nations humanitarian assistance in Kosovo, *Dennis McNamara* emphasizes that children are under risk because of cluster submunition, "Kids are picking up the cluster bombs and getting blown up because the cluster bombs have bright canisters which are very attractive."[528] As it is understood that, in the case of a breach of LOAC during an air strike, especially humans and communities suffer in different aspects daily and social activities, economic and cultural life, physical and psychological health and economic contribution to national productivity.

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[526] James G. Stewart, p. 1050.
[527] Rae McGrath, pp. 30-31.
[528] Rae McGrath, p. 49.

CONCLUSION

In the first chapter, the historical process and the progress of the law of weaponry are explained in premodern modern, the emergence of the first rules and regulations, and after the Second World War period. The basic concepts of the law of armed conflict emerged in the premodern era. Especially, the doctrines of the *Jus ad Bellum* and *Jus in Bello* are introduced by Hugo Grotius, and he laid the groundwork for the evolution of the modern law of armed conflict. After that, the modern law of armed conflict emerged from three primary concepts of the military necessity, humanity, and chivalry. In addition to this, the premodern agreements and the regulations concerning with LOAC are exemplified from the human history.

Dr. Francis Lieber made the crucial contribution for the following declarations and conventions known as 'Lieber Code' in 1863. After two decades, in the modern law of weaponry, St. Petersburg Declaration became the first international agreement to forbid a particular weapon in the theatre of war and, the declaration set the framework for the principle of military necessity. The significant breakthroughs were made in the Hague Conferences of 1899 and 1907 in which the fundamental tenet of unnecessary suffering was stated for the first time. Besides the unnecessary suffering, the declarations also restricted the use of certain weapons including poisoned weapons and explosive bullets, asphyxiating gases, balloons, and naval mines. However, widely used chemical weapons led to the death and injury of hundreds of thousands of people during the First World War. Due to the devastating effects of the chemical weapons during the War, the Geneva Gas Protocol was adopted in 1925. With the protocol, the use of asphyxiating, poisonous or other gasses, and biological warfare materials were banned in the international armed conflict. Meanwhile, the air vehicles were preferred as one of the means of combat vehicles during the First World War.

The use of the flechette by aircraft caused concern of the discrimination between combatants and civilians. The definition of the military objective was mentioned in the Hague Air Warfare Rules of 1923 that was never being adopted. However, it is based on the following conventions and regulations. In 1949, the four Geneva Conventions and its Additional Protocols were accepted to regulate the conduct of armed conflict and protect the nonparticipants from the effects of the war because of painful and horrible experiences during the Second World War.

In the past three decades, there has been no any progress concerning the law of armed conflict. The Biological Weapons Convention entered into force in 1975, and the Convention is the first international regulation to completely forbidden the biological weapons. Moreover, for the first time, the ENMOD Convention bans the use of the environment as of a weapon in 1976. The Additional Protocol I reformulated the principles of the modern law of armed conflict. The Protocol redefined and reviewed the principles of the military necessity, superfluous injury or unnecessary suffering, and the prohibition the use of the environment as methods or means of warfare.

The most comprehensive convention was the Convention Weapons Convention (CCW) of 1980, which included five protocols. The first three protocols involve the prohibition and the restriction of incendiary weapons, mines and booby traps, and non-detectable fragments. The Protocol IV forbids blinding laser weapons, which was adopted in 1995, and party states adopted the Protocol V on Explosive Remnants of War in 2003. Because of the deficiencies of the Geneva Gas Convention, there should be a rearrangement of the more comprehensive convention. The Chemical Weapons Convention of 1993 completely prohibits unmitigated chemical weapons in every aspect. Four years later, the Anti-Personnel Ban Convention of 1997 was adopted by party states. Certain air weapons were prohibited for the first time by the Convention on Cluster Munitions of 2008. The convention forbids the use, development, production, stockpiling, and transfer of cluster munitions. However, the Convention of 2008 is not commonly approved as well the AP Mine Convention by all party states.

In the light of all these facts mentioned above, the development of the law weaponry has been adapted to the necessities of the time since the St. Petersburg Declaration. Notably, the weapons of mass destructions such as biological and chemical weapons are completely prohibited, and most of the members of the United States have approved CWC and BWC.

In the second chapter, it is stated that the basis of the law of weaponry is composed of the principles of military necessity, proportionality, discrimination, superfluous injury and unnecessary suffering, and the protection of the environment. The International Community has been more sensitive towards human rights violations and the protection of the environment in every passing year. Actually, the advanced communication technology and the mass media power are undeniable factors such as the images of the killed and injured innocent people through the air strikes, the burning of the oil wells and the oil-slicked birds in the First Gulf War. The international community reacted to such kinds of violations, together with the protection of the environment. These reactions indicate how the customary principles of the LOAC by the international community have become accepted and approved.

In the third chapter, the existing and future weapon systems were analyzed according to the law of weaponry. Firstly, the weapons under the international legal regulations were assessed with reference to the binding conventions and declarations. Although there is no available regulation related to conventional weapons, they were evaluated under the guidance of fundamental principles of the law weaponry in the second chapter. Especially, the planner or executors of air strike have to make the air raid plan by taking into consideration of the military necessity, proportionality, and discrimination. The principles of the discrimination should be noted in two different perspectives. The planner or executor of the air attack must make a distinction between the combatants and the civilians. Moreover, the planner or executor of the air campaign must also consider the results of the indiscriminate weapons that owe high CEP such as long range unguided rockets, or bombs, etc.

The cluster munitions are one of the frequently used air-launched weapons systems. However, the use of the cluster munitions is prohibited by the Convention on Cluster Munitions of 2008, but the Convention draws no expected impact at global scale. The neutral party states on CCM suggest that the conventional weapons provide tactical military advantages for the air forces in the conflicts; furthermore, they remark that when correctly used as regards the principles of the law of weaponry, the use of the cluster munitions will not be an infringement of LOAC. Besides, the failure rate for each cluster bomb can be reduced through the technological development and with the addition of self-destruct systems. The new policy of the United States Department of Defense is remarkable. The policy includes the reduction of the failure rate at least 1 percent and the cluster munitions not meeting the 1 percent standard will be demolished by 2018. Many countries will have the same tendency as to the cluster munitions like the United States.

CWC prohibits the use of incendiary weapons to be used against civilians and civilian objects and attacks on plant cover or forests except used for military purposes. However, the existing principles of the LOAC are already sufficient to prohibit the use of incendiary weapons on civilian targets. The controversial point is whether incendiary weapons cause superfluous injury and unnecessary suffering on the target or not. The general view of the medical specialists is that incendiary weapons cause superfluous injury and unnecessary suffering on combatants and civilians. Because of severe and third-degree burns on human body, incendiary weapons cause refractory and agonizing wounds.

The ban of blinding laser is an encouraging development for unlawful weapon systems in the future. Although the blinding laser systems are developed, they have never been used in any conflicts. With the humanitarian concerns, the blinding laser systems are prohibited under the Protocol IV of CWC.

The chemical and biological weapons are undoubtedly inconsistent with the customary rules of the Law of Armed Conflict (LOAC) by common consent. Except for Israel and the several African States, the rest of the states signed and acceded to BWC. The chemical weapons had been used as a weapon of mass destruction in many conflicts and caused the deaths and injuries of hundreds of people. Undoubtedly, indiscriminate and unnecessary suffering characteristics of chemical weapons had an influence on the prohibition of chemical weapons. Especially, after the Cold War, the issue of chemical weapons occupied the world agenda because of their employment by the Saddam Hussein regime in the First Gulf War. In the case of the use of chemical weapons in a conflict, the aggressor state could experience international political pressure, economic embargo, and even military intervention. As can be remembered, the Syrian Army was accused of using chemical weapons in the Ghouta are of Damascus on 21 August 2013. The international community gave a strong reaction to the Syrian Government. The community had even thought to perform military operations to prevent another possible Syrian chemical attack. Immediately, the Syrian Government decided to meet the obligations of CWC. In a couple of years, the Syrian Chemical Stocks were destroyed through the Organization for the Prohibition of Chemical Weapons (OPCW). As a result, except for Egypt, Israel, North Korea and South Sudan, all members of the UN acceded to CWC.

The status of nuclear weapons is different from chemical and biological weapons. According to the decision of ICJ, nuclear weapons have indiscriminate characteristics because of unlimited and widespread destruction. However, the court could not place a final judgment on the use of the nuclear weapons because of international political drawbacks. The permanent members of the United Nations Security Council were unwilling towards the possession of nuclear weapons by other states. The proliferation of nuclear weapons could destabilize the balance of international politics. Therefore, the permanent five implemented the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1970. Having nuclear weapons means political power more than its military power for the states. In the course of time, India, Pakistan, North Korea, and Israel (widely believed) developed their own nuclear weapons. The permanent five are unwilling to capitulate the new participation to nuclear club; the countries such as Iran and North Korea have undergone international economic, political and military sanctions because of their nuclear programs.

The use of blast weapons, white phosphorous, flechette and depleted uranium munitions are also another controversial circumstances. Certain humanitarian and health organization have asserted that they are inhumane and unlawful weapon systems. Concerning the blast weapons, these organizations have stated insufficient arguments to enforce their claims.

Moreover, in the case of WP munitions as incendiary weapons, they are assessed in the same legal status in the law of weaponry. Similarly, WP munitions cause severe and third-degree burns on the human body. Even, the effects of WP may be painfully continuous to reach even the bones. Undoubtedly, the use of WP as incendiary weapons violates the principles of superfluous injury and unnecessary suffering. However, many countries have claimed that they have used WP munitions for targeting, marking and illumination. The air forces must avoid using WP munitions as incendiary weapons in the military conflicts.

The issue of depleted uranium munitions has been discussed regarding their legality and whether they comply with the law of weaponry or not. Both sides of the assertors have cited strong evidence to prove their argument. The significant point is that the staff of the air force should consider the humanitarian concern more than military advantages in the long term. The adverse outcome of the use of DU munitions cannot be seen in the near future. Owing to the judicial and political responsibility in future, the superiors of the air force must prefer alternative weapon systems to achieve same mission even if it is costly.

The matter of the explosive remnants of war (ERW) and unexploded ordnance (UXO) also concerns the air forces. According to the CCW Protocol V, the belligerent is under responsibility to take precautions for ERW and UXO, to announce air strike locations to the UN or local authorities. Moreover, when required, the air force must employ its professional EOD teams to struggle against the threat of ERW and UXO in a humanistic manner.

In the present and future of the law of weaponry, the use of UAV & UCAV in the conflicts has already caused concern to comply with LOAC. Notably, the US Air Force has carried out global counter-terrorism air operations through UCAV (RPA) since the 2000s. The UCAV operations have been criticized for violating military targeting rules. In consequence of the strikes, many local civilians were killed and injured in the countries where military operations were carried out. This kind of unlawful operations has caused negative reactions from both local people and international communities. This situation has also induced the questioning of the legitimacy of operations by the international community. According to the striking surveys of the Pew Research Center in 2013, in 20 countries where the public survey was carried out, more than half of the participators of the survey in 17 countries expressed disapproval about the US's conduct of drone strikes both in majority Muslim nations, but also in Europe and other regions.[529] Another more comprehensive survey in 2014 by the same research center, half or more of the public stated the adverse opinion about the US's UCAV strikes in 37 of the 44 countries.[530] In the planning and implementation phases, the planner and executor of the air operations must consider the military targeting rules. Moreover, the air forces must also keep the military legal experts in the planning and implementation phases of the drone strikes to avoid similar outcomes.

In future, the autonomous weapons systems (AWS) will create important ethical, political and legal concerns because humans will be out of the decision-making mechanisms. The AWS's are classified as the man-in-the-loop, the man-on-the-loop systems, and man-out-of-the-loop systems. Most of the existing weapons systems are produced based on the man-in-the-loop algorithm. The most suitable application will be the man-on-the-loop systems for the air forces. This kind of system independently performs navigation and targeting, and taking initial strike decision. Nonetheless, the final confirmation of the air strike will be approved by human operators. As a result, the human operator will have all responsibility to attack the enemy target.

The applications of nanotechnology will provide many advantages for the air forces in the future. Thomas Faunce and Hitoshi Nasu emphasizes such

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[529] Bruce Drake, "US Use of Drones, Under New Scrutiny, Has Been Widely Opposed Abroad", **Pew Research Center RSS**. (06.02. 2013).
http://www.pewresearch.org/2013/02/06/u-s-use-of-drones-under-new-scrutiny-has-been-widely-opposed-abroad/, (29.06.2016).

[530] "Global Opposition to US Surveillance and Drones, but Limited Harm to America's Image", **Pew Research Centers Global Attitudes Project RSS**, (14.07.2014).
http://www.pewglobal.org/2014/07/14/global-opposition-to-u-s-surveillance-and-drones-but-limited-harm-to-americas-image/, (29.06.2016).

instances as “miniaturization of communication devices, conventional missiles with reduced mass and enhanced speed, small metal-less weapons made of nanofibre composites, small missiles with enhanced accuracy guided by inertial navigation systems, and armor-piercing projectiles with increased penetration capability.”[531] However, besides the advantages, the nanotechnology may create troubles for the law of the human rights and the environment. Dense Inert Metal Explosive (DIME) developed and deployed by the Israeli army is a good example. DIME may cause severe and incurable wounds because of the scattering microparticles of fragmentation. The nanoparticles in the lungs can cause suffocation, in which the body cannot break down the particles because of their unique structure and micro size. In addition, the nanotechnology weapons may contaminate the environment and the ruins of nanoparticles may endanger the health of humans. The air forces must develop and employ the nanotechnology weapons in the conflicts by taking into account the previously mentioned matters.

Though there are no binding rules of international law as to cyber-warfare, the fundamental principles of the law of conflict are binding to cyber war. In the case of a cyber-attack against a civilian air traffic control, a hospital or a nuclear power facility, the consequences of the attack may cause devastating civilian loss and damage the environment. The air force will be responsible for the actions due to the infringement of the customary principle of LOAC. The planner of executor of cyber-attack must make a distinction between the civilian and military objects before the cyber-attack.

In the fourth chapter, the examples of the judicial decisions were given in appertaining to the case of the violation of LOAC. In the circumstances of the disregard of the principles of the law of weaponry, the country or the executor of the air strike will be sentenced for a war crime with an imprisonment or compensation. Furthermore, when the air force regularly flouts the law of the armed conflicts in the engagement conflicts, the

[531] Thomas Faunce and Hitoshi Nasu, “Nanotechnology and the International Law of Weaponry: Towards International Regulation of Nano-Weapons”, **Journal of Law, Information and Science**, Vol. 20, no. 2009/2010, (2009-2010), pp. 21-54.

international and domestic community reacts and goes against the conducted foreign policy of the belligerent. Under the circumstances, either the states will review the strategies of its foreign policy or the air force carries out the air raids by taking into consideration the principles of the law of the armed conflicts. The US public had withdrawn support for the US Vietnam foreign policy because of the gross violations of human rights in the Vietnam War. Moreover, the great majority of the international community is opposed to the US drone strikes against terrorist because of the violation of the principle of the discrimination between combatants and civilians. Furthermore, due to disregard of the customary principles of the law weaponry, Israel could not receive sufficient international support for the conducted military operations during the Lebanon and Gaza Wars. As it is mentioned, a state can start a war in the case of Jus in Bello. However, if a state violates the rules of Jus ad Bellum, the legality of the war may be discussed in the international arena.

Actually, the humanitarian plight is the most crucial issue concerning the disregard for the core principles of LOAC. Hundreds of thousands of civilians have been killed, injured because of the violation of the law of weaponry for years. People have also been forced to immigrate to safety zones and countries. Most of the wounded people have become permanently disabled, and have actively failed to attend the labor force. Moreover, many people who lost family members had the psychological trauma, and they have even been unable to cultivate their lands because of unexploded ordnance. The targeting of military or civilian objects including hazardous substances such as oil depots can cause environmental disasters. The negative impacts of the attacks can cause permanent environmental damage and it could take a long time to decontaminate. Principally, the planner or executor of the airstrikes must consider the humanitarian concerns before they carry out their air operations.

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APPENDICES

Appendix 1: Table of Cases

1. Legality of the Use by a State of Nuclear Weapons in Armed Conflict, Advisory Opinion, I.C.J. Rep. 1996 (July 8), p. 36, p. 66, pp. 83-84.
2. Judgment, Dusko Tadic Case (IT-94-1-AR72 ICTY), Appeals Chamber, 2 Oct.1995, p. 53, p. 121.
3. Judgement, Milan Martic Case (IT-95-11-A ICTY), Appeals Chamber, 8 October 2008, p. 38, pp. 123-124.
4. Case of Isayeva v. Russia (dec.), no. 57950/00, 24 February 2005, ECHR 2005-XV, pp. 120-121.
5. Case of Kerimova and Others v. Russia, no. 17170/04, 20792/04, 22448/04, 23360/04, 5681/05, 5684/05, Judgment, 03.05.2011, ECHR 2011, p. 47.
6. I/A Court H.R., Santo Domingo Massacre v. Colombia Case, Judgment of Nov 30, 2012, Series C. No. 259, p. 121.
7. Physicians for Human Rights and the Palestinian Center for Human Rights v. Doron Almog—O.C. Southern Command and the State of Israel—The Minister of Defence, p. 95.

Appendix 2: Table of Treaties

1. **The 1868 St. Petersburg Declaration,** the declaration on Renouncing the Use, in Time of War, of Explosive Projectiles Under 400 Grammes Weight. (Saint Petersburg 29 November 1868) *entered into force* 11 December 1868.

2. **The 1899 Hague Convention Declaration (IV, 2)**, the declaration on Concerning Asphyxiating Gases (The Hague 29 July 1899*) entered into force* 04 September 1900.

3. **The 1899 Hague Convention Declaration (IV, 3)**, the declaration on Concerning Expanding Bullets (The Hague 29 July 1899*) entered into force* 04 September 1900.

4. **The 1907 Hague Convention Declaration (XIV)**, the Prohibiting the Discharge of Projectiles and Explosives from Balloons Respecting the Laws and Customs of War on Land (The Hague 18 October 1907*) entered into force 27* November 1909.

5. **The 1925 Geneva Gas Protocol,** the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (Geneva, 17 June 1925), 94 L.N.T.S. 2138, *entered into force* 08 Feb. 1926.

6. **The 1972 Biological Weapons Convention (BWC),** the Convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction (London, Moscow and Washington, 10 Apr 1972) 2575 U.N.T.S. *entered into force* 26 March 1975.

7. **The 1976 ENMOD Convention, the** Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (New York, 10 Dec. 1976) 1108 U.N.T.S. 151, *entered into force* 5 Oct. 1978.

8. **The 1977 Additional Protocol I to the Geneva Conventions of 12 August 1949,** the Protocol on Relating to the Protection of Victims of

International Armed Conflicts (Protocol I), 1125 U.N.T.S. 3, *entered into force* 7 Dec. 1978.

9. **The 1980 Convention Weapons Convention (CCW),** the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (with Protocols I, II and III) (Geneva, 10 Oct. 1980) 1342 U.N.T.S. 137, *entered into force* 2 Dec. 1983.

10. **The 1992 Chemical Weapon Convention (CWC),** Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (Geneva, 3 Sept. 1992) 1974 U.N.T.S. 45, *entered into force* 29 April 1997.

11. **The 1995 Protocol on Blinding Laser Weapons,** the Additional Protocol to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (Protocol IV, entitled Protocol on Blinding Laser Weapons) (Vienna, 13 Oct. 1995) UN Doc. CCW/CONF.I/16 Part I), *entered into force* 30 July 1998.

12. **The 1997 Anti-Personnel Mine Ban Convention (Ottawa Treaty);** the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction (Oslo, 18 Sept. 1997) 2056 U.N.T.S. 211, *entered into force* 1 Mar. 1999.

13. **The 2003 Protocol on Explosive Remnants of War,** the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be deemed to be Excessively Injurious or to have Indiscriminate Effects (Protocol V). (Geneva, 28 November 2003), 22495 U.N.T.S. 2399, *entered into force* 12 Nov. 2006.

14. **The 2008 Convention on Cluster Munitions,** (Dublin, 30 May 2008) 2688 U.N.T.S 47713, *entered into force* 01 August 2010.