

Implications of Lethal Autonomous Weapon Systems (LAWS): Options for Pakistan

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Abstract

According to general perception, future wars will be fought with Lethal Autonomous Weapon Systems (LAWS). As LAWS become a technological reality with the ability to make independent decisions about the use of weapons, policymakers would also have more opportunities to deploy a military force with very limited or no risk to personnel. Though, there is pressure to not allow such a system to decide whether or not to kill a human - ethical, legal, military, technological, and economic debates are underway about whether these types of weapons should be limited or banned altogether. While machines are already part of today's military operations, with their increased autonomy, decision-makers may become more prone to the use of force. Though autonomous technology can serve humanitarian purposes, nonetheless, there need to be guarantees that these technologies would not be transferred from humanitarian work to serve military purposes. Pakistan's stance is very clear: it has called for a ban on LAWS. However, Pakistan would be ill-advised to ignore Research and Development in this technology. It needs to follow the technological advancements in this field, for research and security purposes.

Key words: LAWS, Artificial Intelligence, Just War, International Humanitarian Law, Ottawa Treaty, Conventional Weapons, CCW Review Conference.

Introduction

Deterrence has often led to the mitigation of instability, chaos, conflicts or wars. Hence, the purpose of acquisition or

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development of weapons by states has usually been propagated as the promotion of peace and security. However, with technological developments, the lethality of weapons has been increasing resulting in irreversible humanitarian consequences. The international community has failed to ban such deadly weapons allowing pursuit of national interests at the expense of global peace and security. Such is the case of Lethal Autonomous Weapon Systems (LAWS). So, the question arises whether LAWS are going to make human civilisation more secure or vulnerable? What are the ethical, legal, technological, security and economic implications of their potential deployment? In the end, how best can Pakistan, a developing state, cope with the emerging situation?

Policymakers believe that LAWS as Artificial Super Intelligence (ASI) capable machines will affect all aspects of the human experience ‘from medicine to driving autos.’¹ As LAWS become a reality, governments will have more options when it comes to troop deployments in hazardous areas. Moreover, as cost in terms of human capital lowers, policymakers will have to confront new difficulties and along these lines need to make diverse calculations.

Currently, however, there is a push to prevent an arms race in these weapons. There is, likewise, pressure to limit the hazard to life. The concern is that such innovative systems are likely to ‘evolve’ by themselves. The international community, furthermore, will need to watch how forthcoming changes in the character of fighting will affect foreign policy and decision-making during times of conflict. Pakistan believes that forbidding the development of LAWS is important on the grounds pertaining to International Humanitarian Law (IHL) that their enlistment in military affairs is viewed as the third era in warfare after the dawn of the nuclear age.

Be that as it may, a significant part of the debate surrounding LAWS originates from the concerns about its ethical ramifications. There are endeavours to initiate legislation and controls that will restrain their development and utilisation. For instance, in April 2016, the United Nation’s Conference of the Convention on Certain Conventional Weapons

¹ Alex Davies, “IBM’s Watson Lets you Talk to your Self-Driving Car,” *WIRED*, June 16, 2016, <https://www.wired.com/2016/06/ibms-using-watson-make-self-driving-cars-talk-humans/>.

(CCW) was held in Geneva,² with speakers from the Campaign to Stop Killer Robots and Human Rights Watch (HRW) currently trying to prohibit LAWS.³ This paper is an attempt to discuss the ethical, legal, technological, security and economic implications of the development of LAWS as well as to consider the challenges which the international community needs to be cognizant of before deploying such technology.

What are LAWS?

LAWS are capable of automatically selecting and attacking their targets ‘without any human interference in the loop.’⁴ They are also known as ‘robotic weapons or killer robots.’⁵ Drones are generally described as unmanned systems but this is an inaccurate categorisation because there is human involvement in their operation controlled by an operator via remote, while autonomous weapons are often classified as ‘out-of-the-loop’ systems. The operator is taken out of the loop once they are programmed which means that the machine completes its assignment without human directions. In contrast with autonomous weapons, drones are based on ‘in-the-loop’ system. Self-ruling weapons, on the other hand, are equipped with decision-making capacity.⁶

In this regard, LAWS can be divided into two categories: semi-autonomous weapons (SAWs) and autonomous weapons (AWs), depending on their decision-making capacity.⁷ SAWs require humans for their functioning. However, AWs are fully capable of functioning without

² UNOG, “2016 Meeting of Experts on LAWS” (Geneva: United Nations Office), accessed January 9, 2018, [https://www.unog.ch/80256EE600585943/\(httpPages\)/37D51189AC4FB6E1C1257F4D004CAFB2?OpenDocument](https://www.unog.ch/80256EE600585943/(httpPages)/37D51189AC4FB6E1C1257F4D004CAFB2?OpenDocument).

³ For further information, see “Campaign to Stop Killer Robots,” *Campaign to Stop Killer Robots*, 2016, <https://www.stopkillerrobots.org>, accessed September 15, 2017.

⁴ HRW, “Losing Humanity: The Case against Killer Robots” (New York: Human Rights Watch, 2012), <https://www.hrw.org/report/2012/11/19/losing-humanity/case-against-killer-robots>.

⁵ Ibid.

⁶ Alex Leveringhaus, *Ethics and Autonomous Weapons* (London: Palgrave Macmillan, 2016), 53.

⁷ Michael N. Schmitt, “Autonomous Weapon Systems and International Humanitarian Law: A Reply to the Critics,” *Harvard National Security Journal* (2013), <http://harvardnsj.org/wp-content/uploads/2013/02/Schmitt-Autonomous-Weapon-Systems-and-IHL-Final.pdf>.

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human help. SAWs are part of the arsenal of many states, such as sentry guns deployed along borders, for example, the Israeli ‘Iron Dome’.⁸ However, unmanned combat aerial vehicles (UCAV) or ‘combat drones’ do not fall in the category of LAWS because they are remotely-controlled by a human. LAWS with the ability to make life or death decisions and sniff out the enemy could very soon be a feature of warfare as new age arms race between world powers gathers momentum, therefore, their likely development (and threat of use) cannot be ignored.

Literature Review

The available literature on LAWS usually focuses on two dimensions. One, these weapons should be made illegal given their moral implications. Two, the development of LAWS is inevitable because of the future of warfare.⁹ The Future of Life Institute published an open letter pertaining to the humanitarian aspects of the development of LAWS and as of October 2016, 20,8000 people signed the letter, indicating public sentiments about this technology.¹⁰ Similarly, HRW persuaded:

The United Nations (UN) to adopt another Convention on Certain Conventional Weapons (CCW) to criminalise the utilisation of LAWS.¹¹

Proponents of the advancement of LAWS usually have military background or belong to the defence industry and argue that LAWS would help in saving the lives of soldiers by putting fewer people at risk. Difficult jobs such as defusing bombs, clearing mines etc. would be done more efficiently and might result in less collateral deaths in the

⁸ “Iron Dome,” *GlobalSecurity.org*, accessed 9 January 2018, <https://www.globalsecurity.org/military/world/israel/iron-dome.htm>.

⁹ “Moving Forward in 2016,” *Campaign to Stop Killer Robots*, December 30, 2016, <https://www.stopkillerrobots.org/2016/12/moving-forward-in-2016/>.

¹⁰ “Autonomous Weapons: An Open Letter from AI & Robotics Researchers” (Miami: Future of Life Institute, 2015), <https://futureoflife.org/open-letter-autonomous-weapons/>.

¹¹ Mary Wareham, “Statement to the Convention on Conventional Weapons Fifth Review Conference Preparatory Meeting on Main Committee II” (speech, Human Rights Watch, Geneva, September 2, 2016), <https://www.hrw.org/news/2016/09/02/statement-convention-conventional-weapons-fifth-review-conference-preparatory>.

battlefield.¹² However, P.W. Singer believes that the contention on LAWS is an unsettled issue since they will be developed no matter what debate emerges or takes place in academic circles.¹³ Singer has varied views on the subject. In his two books entitled *Wired for War* (2009), and *Ghost Fleet* (2015) he argues that lives of civilians as well as military men can be saved with the effective deployment of LAWS.¹⁴

For these weapons to be fully autonomous, computers are required to learn from their surroundings automatically. For the time being, computers have not developed enough to differentiate between a friend or an enemy, such as Unmanned Ground Vehicles (UGVs).¹⁵ The levels of communication computers are having with humans for now is through ‘voice communication.’ With the advancement of this technology in the future, a time may come when computers may start having social interactions. From these interactions, computers may be able to gradually develop an individual’s personality traits.¹⁶ There is a 50 per cent chance that ASI will be invented by the year 2033.¹⁷

According to a publication pertaining to his vision of conflict in the year 2035, the US Chairman of Joint Chiefs, Gen. Joseph Dunford remarked that LAWS will be part of future conflict.¹⁸ Paul Scharre in his articles on LAWS with the Center for New American Security (CNAS) asserts that safety concerns regarding LAWS can be mitigated and used in future conflicts.¹⁹ According to an article ‘20YY preparing for War in the

¹² Paul Scharre, *Autonomous Weapons and Operational Risk: Ethical Autonomy Project*, report (Washington, D.C.: Center for a New American Security, 2016), 6.

¹³ Peter W. Singer, “In the Loop? Armed Robots and the Future of War,” *Brookings Institution*, January 28, 2009, <https://www.brookings.edu/articles/in-the-loop-armed-robots-and-the-future-of-war/>; and Peter W. Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (New York: Penguin Press, 2009), 1-5.

¹⁴ Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century*, 1-5.

¹⁵ Kristen Grauman and Bastian Leibe, “Visual Object Recognition,” *Synthesis Lectures on Artificial Intelligence and Machine Learning* 5, no. 2 (2011): 1-181 (3); and Andrew Cockburn, *Kill Chain: The Rise of the High-Tech Assassins* (New York: Henry Holt and Company, 2015), 118-132.

¹⁶ Clifford Nass and Scott Brave, *Wired for Speech: How Voice Activates and Advances the Human-Computer Relationship* (Cambridge: MIT Press, 2005), 6.

¹⁷ Nick Bostrom, “How Long before Superintelligence?” *Linguistic and Philosophical Investigations* 5, no. 1, (2006): 11-30.

¹⁸ Kevin D. Scott, *Joint Operating Environment 2035: The Joint Force in a Contested and Disordered World*, report (Fort Belvoir: Defense Technical Information Centre, 2016), <http://www.dtic.mil/dtic/tr/fulltext/u2/1014117.pdf>.

¹⁹ Scharre, *Autonomous Weapons and Operational Risk*, 50.

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Robotic Age' by Robert Work and Shawn Brimley, LAWS are the future of warfare, therefore, these weapons must be developed to stay ahead of any enemy.²⁰ On the contrary, Andrew Cockburn writes about the shortcomings and technological limitations of LAWS.²¹

Currently Employed LAWS

Land and naval mines are the most ancient automatically triggered lethal weapons,²² used since the Sixteenth and Seventeenth Century, respectively. Naval and anti-personnel mines also come under the category of autonomous weapons.²³ Anti-personnel mines are banned in many countries under the Ottawa Treaty signed in 1997.²⁴ However, the US, Russia, China, India, Pakistan and many Middle East states are not signatories.²⁵

The automated systems available today can defend designated subjects through active protection systems such as the US Phalanx Close In Weapon System (CIWS) (Figure 1),²⁶ the Israeli Trophy,²⁷ Iron Dome

²⁰ Robert O. Work and Shawn Brimley, *20YY Preparing for War in the Robotic Age*, report (Washington, D.C.: Center for a New American Security, 2014), https://s3.amazonaws.com/files.cnas.org/documents/CNAS_20YY_WorkBrimley.pdf?mtime=20160906082222.

²¹ Cockburn, *Kill Chain: The Rise of the High-Tech Assassins*.

²² "Hyper-Intelligent Systems and Fully Autonomous Weapons and Platforms are Gravest Risk to Mankind," *International Defence, Security & Technology*, accessed January 10, 2018, <http://idstch.com/home5/international-defence-security-and-technology/threats/hyper-intelligent-systems-and-fully-autonomous-weapons-and-platforms-are-gravest-risk-to-mankind/>.

²³ Mark Gubrud, "Why should We Ban Autonomous Weapons? To Survive," *IEEE Spectrum*, June 1, 2016, <https://spectrum.ieee.org/automaton/robotics/military-robots/why-should-we-ban-autonomous-weapons-to-survive>.

²⁴ UNOG, "Disarmament" (Geneva: United Nations Office at Geneva), accessed January 10, 2017, <https://www.un.org/disarmament/geneva/aplc/>.

²⁵ Sara Schmitt, *The Ottawa Convention at a Glance*, fact sheet (Washington, D.C.: Arms Control Association, 2017), <https://www.armscontrol.org/factsheets/ottawa>.

²⁶ "Phalanx Close-In Weapon System: Last Line of Defense for Air, Land and Sea," *Raytheon.com*, accessed January 10, 2018, <http://www.raytheon.com/capabilities/products/phalanx/>.

²⁷ Dylan Malyasov, "Israeli Ministry of Defence Purchases Hundreds of Trophy Active Protection System," *Defence Blog*, November 10, 2016, <http://defence-blog.com/army/israeli-ministry-of-defence-purchases-hundreds-of-trophy.html>.

(Figure 2), Russian Arena (Figure 3),²⁸ and the German AMAP Active Defence System (ADS).²⁹ US Phalanx CIWS production started in 1978 and was first installed in 1980 on the USS Coral Sea. The Phalanx has had an active and continuous production, upgrade, and overhaul programme since 1978.

The Iron Dome missile defence system (Figure 2) has the capability to identify and destroy projectiles before they land in Israeli territory and is considered one of the most effective anti-missile systems in the world.

Russia's new active protection system Arena-M for T-72 and T-90 tanks is capable of protecting armoured vehicles from US Tube-launched Optically-tracked Wire-guided (TOW) missiles.³⁰

Brimstone is an advanced air-to-ground radar-guided missile developed by MBDA for the UK Royal Air Force (RAF). The missile can effectively strike fixed and moving ground-based targets with height accuracy.³¹ Brimstone works on the fire-and-forget rule and can be used against a massive enemy armoury. Laser guidance tools were added in the missile for specification of targets after problems due to heavy collateral damage during the Afghan War.

Dedicated for the Suppression of Enemy Air Defence (SEAD) mission, Harpy is an operational loitering attack weapon. The current version of Harpy is also deployed as a fire-and-forget weapon.³² South Korean forces have installed a team of robots that have heat and motion detectors to identify potential targets more than 2 miles away (Figure 4). The SGR-1, however, needs a human operator to give it the go ahead to fire.³³ Norway has manufactured the modern weapon system for its Joint

²⁸ "ARENA Active Protection System," *Fofanov.armor*, accessed January 10, 2018, <http://fofanov.armor.kiev.ua/Tanks/EQP/arena.html>.

²⁹ "AMAP-ADS: Active Vehicle Protection," *Rheinmetall Chempro*, accessed January 10, 2018, https://www.rheinmetall-chempro.com/en/rhc/systeme_und_produkte/produktuebersicht/amap_ads/index.php.

³⁰ "ARENA Active Protection System," *Fofanov.armor*.

³¹ "Brimstone Air-to-Ground Missile," *airforce-technology.com*, accessed January 10, 2018, <http://www.airforce-technology.com/projects/brimstone-air-ground-missile/>.

³² "Harpy Air Defense Suppression System," *Defense Update*, March 4, 2006, <http://defense-update.com/directory/harpy.htm>.

³³ Mark Prigg, "Who Goes There? Samsung Unveils Robot Sentry that can Kill from Two Miles Away," *Daily Mail Online*, September 15, 2017, <http://www.dailymail.co.uk/sciencetech/article-2756847/Who-goes-Samsung-reveals-robot-sentry-set-eye-North-Korea.html>.

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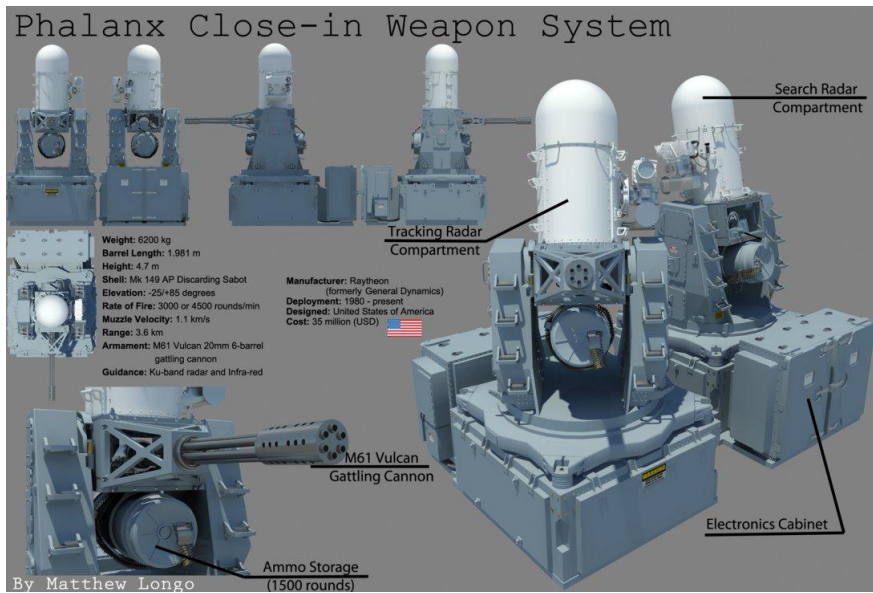
Strike Missile (JSM) aircraft, which can be carried externally and internally in the bomb bay of the F-35.³⁴

Most of these weapons only need one time programming by a human operator that enables them to automatically select, engage and destroy their targets without any human in the loop.

³⁴ “Joint Strike Missile,” *Kongsberg Gruppen*, accessed January 10, 2018, <https://www.kongsberg.com/en/kds/products/missilesystems/jointstrikemissile/>.

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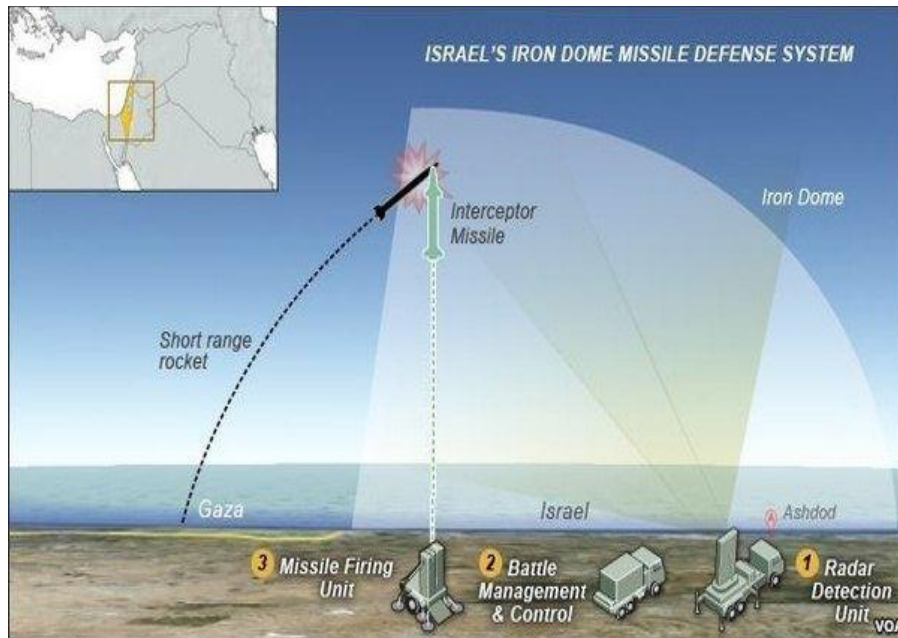
Figure-1
US Phalanx CIWS



Source: Mathew Longo, "Phalanx Close-in Weapon System," cited in Vinicius Castro, "Phalanx CIWS: The Defense Tower that Blows up any Missile," *Air & Naval Defense*, August 8, 2013, <http://www.defesaaereanaval.com.br/phalanx-ciws-a-torre-de-defesa-que-explode-qualquer-missil/>.

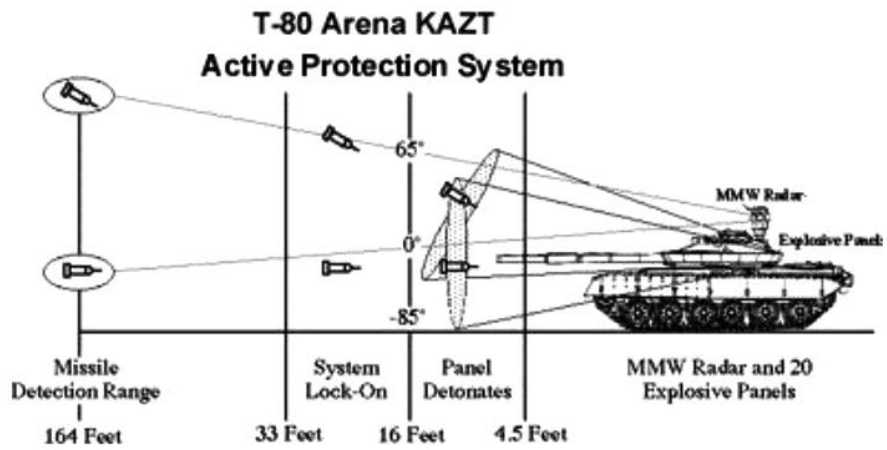
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Figure-2
Iron Dome Missile Defence System



Source: *Jewish Virtual Library*, s.v. "Israel Defence Forces: Iron Dome Missile Defence System," accessed November 25, 2017, <http://www.jewishvirtuallibrary.org/iron-dome-missile-defense-system>.

Figure-3
Russia's Arena-M for T-72 and T-90 Tanks



Source: "ARENA Active Protection System," *Fofanov.armor*.

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Figure-4
South Korean SGR-1



Source: Prigg, “Who Goes There? Samsung Unveils Robot Sentry that can Kill from Two Miles Away.”

However, despite the non-availability of fully developed Artificial Intelligence Systems (AIS),³⁵ Samsung Techwin (now Hanwha Techwin) Company’s SGR-A1 is a first of its kind robot ‘sentry gun’ with autonomous capabilities.³⁶ Norway’s anti-ship and land-attack Naval Strike Missile (NSM) automatically strikes a ship at its most vulnerable position.³⁷ The US Navy’s X-47B Unmanned Combat Air System

³⁵ “Third UN Meeting Opens April 11,” *Campaign to Stop Killer Robots*, April 5, 2016, <http://www.stopkillerrobots.org/2016/04/thirdccw/>.

³⁶ J. Kumagai, “A Robotic Sentry for Korea’s Demilitarized Zone,” *IEEE Spectrum* 44, no. 3 (2007):16-17.

³⁷ “Naval Strike Missile-NSM,” *Kongsberg Gruppen*, accessed January 10, 2018, <https://www.kongsberg.com/en/kds/products/missilesystems/navalstrikemissile/>.

(UCAS) is the first aircraft with autonomous attack capabilities.³⁸ Similarly, Israel's Harop,³⁹ the United Kingdom's Taranis 161 and South Africa's Rheinmetall Skyshield air defence system,⁴⁰ are autonomous weapons with attack capabilities. The Chinese People's Liberation Army (PLA) hosted a contest for autonomous military robots in October 2016.⁴¹ Russia is also in pursuit of autonomous robots to defend their Intercontinental Ballistic Missile (ICBM) sites.⁴² Interestingly, technology that is used in LAWS or in other autonomous weapons is similar to the technology which is being developed for the development of autonomous cars that use artificial intelligence (AI).⁴³

Current Debate on LAWS

The debate regarding LAWS usually revolves around several assertions: ethical and legal issues backed by Non-Governmental Organisations (NGOs); political debate pertaining to the reduction of casualties during an armed conflict; military debate to maintain superiority on the battlefield by countering the enemy's autonomous weapons; and debate surrounding technological limitations as AI is not fully developed yet,⁴⁴ and then there is the issue of cost.

³⁸ "X-47B UCAS Makes Aviation History... Again!" *Northrop Grumman*, accessed January 10, 2018,

<http://www.northropgrumman.com/Capabilities/x47bucas/Pages/default.aspx>.

³⁹ "Harop Loitering Weapon System," *airforce-technology.com*, 2016, <http://www.airforce-technology.com/projects/haroploiteringmuniti/> accessed September 17, 2017.

⁴⁰ "Air Defence Systems: Guarding against the Threat from Above," *Rheinmetall Defence*, accessed January 10, 2018, https://www.rheinmetall-defence.com/en/rheinmetall_defence/systems_and_products/air_defence_systems/index.php.

⁴¹ Jeffrey Lin, P.W. Singer, Hu Yu and Qian Xiaohu, "China's Army Hosts an Autonomous Robot Contest Called 'Overcoming Obstacle 2016,'" *Popular Science*, October 26, 2016, <https://www.popsci.com/chinas-army-hosts-an-autonomous-robots-contest>.

⁴² Adrienne Jeffries, "Only Five Countries actually Want to Ban Killer Robots," *Verge*, May 16, 2014, <https://www.theverge.com/2014/5/16/5724538/what-happened-at-the-un-killer-robot-debate>.

⁴³ *Ibid.*

⁴⁴ Rodney Brooks, "Artificial Intelligence is a Tool, Not a Threat," *Rethink Robotics Blog*, November 10, 2014, <http://www.rethinkrobotics.com/blog/artificial-intelligence-tool-threat/>.

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Ethical and Legal Aspects

The ethical and legal debate about weapons is not new. From the Spartan Army's opposition of long-range weapons to the use of submarines and chemical weapons etc., there is discourse within the international community which either accepts or wants to outlaw a new technology based on the above mentioned assertions. The first concern in favour of banning LAWS is that a machine or machine programme can never develop ethical and legal principles. The second concern is that it is wrong to exclude humans from the system because in that case there would be no one to hold accountable. Simply put, a machine can never understand the value of human life and, therefore, can never be fully trusted.

Another concern is that when the lives of fewer soldiers are lost, it may actually result in more conflicts or wars. The extensive use of drone strikes by the United States in Afghanistan and Pakistan is a case in point. In April 2013, a United Nations (UN) special report asserted that member states should take the initiative in banning these weapons,⁴⁵ and should not develop or deploy these weapons since these weapons violate the 'Principle of Distinction' (*jus in bello*) and 'Principle of Proportionality' (*jus ad bellum*).⁴⁶

As of April 2016, 14 states have called for a preemptive restriction on LAWS: Algeria, Bolivia, Chile, Costa Rica, Cuba, Ecuador, Egypt, Ghana, Vatican City State, Mexico, Nicaragua, Pakistan, State of Palestine, and Zimbabwe.⁴⁷ According to James Barrat, an expert on AI:

⁴⁵ Security Council, "Security Council Adopts First-Ever Resolution Dedicated to Question of Small Arms, Light Weapons," press coverage (New York: United Nations Security Council, September 26, 2013), <https://www.un.org/press/en/2013/sc11131.doc.htm>.

⁴⁶ Alexander Moseley "Just War Theory," in *Internet Encyclopedia of Philosophy*, accessed January 10, 2018, <http://www.iep.utm.edu/justwar/>.

⁴⁷ "Ban Support Grows, Process Goes Slow," *Campaign to Stop Killer Robots*, April 15, 2016, <https://www.stopkillerrobots.org/2016/04/thirdmtg/>.

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Most technology theorists... [believe that] in the quest for [AI], researchers will create a kind of intelligence that is stronger than their own and that they cannot control or adequately understand.⁴⁸

Speaking in the favour of Protocol VI of the Convention on Chemical Weapons (CCW), Steve Goose of HRW advocates the banning of LAWS before their containment goes past the point of no return.⁴⁹ Another UK based NGO, Article 36, propagates that LAWS should neither be used nor developed:

Working in collaboration with the HRW and International Committee of the Red Cross (ICRC), Article 36 efforts to ban full autonomous weapons, such as Brimstone missile.⁵⁰

The legality of a weapon is usually subject to its deployment. In this regard, the legal framework for analysing a new weapon provided in Article 36 of the First Additional Protocol to the Geneva Convention of August 12, 1949 is based on two rules. First, are these weapons indiscriminate? Second, do they inflict unnecessary pain?⁵¹ The first refers to the requirement that during an armed conflict, the general population and military targets must be distinguished. While the second one is about the limit which an army can cross to achieve its aims - civilian loss should not exceed military gains. It has additionally been contended in a

⁴⁸ James Barrat, *Our Final Invention, Artificial Intelligence and the End of the Human Era* (New York: St. Martin's Press, 2013).

⁴⁹ Steve Goose, "Statement by Human Rights Watch to the Preparatory Committee for the Fifth Review Conference of the Convention on Conventional Weapons" (speech, Human Rights Watch, Geneva, August 31, 2016), <https://www.hrw.org/news/2016/08/31/statement-human-rights-watch-preparatory-committee-fifth-review-conference>.

⁵⁰ "Killer Robots: UK Government Policy on Fully Autonomous Weapons," *Article 36*, April 2013, http://www.article36.org/wp-content/uploads/2013/04/Policy_Paper1.pdf.

⁵¹ ICRC, "Commentary of 1987: New Weapons" (Geneva: International Committee of the Red Cross), <https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/1a13044f3bbb5b8ec12563fb0066f226/f095453e41336b76c12563cd00432aa1>.

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provision in the First Protocol, known as the Martens Clause⁵² that requires weapon frameworks and their use to meet the ‘dictates of public conscience’. Therefore, it is argued that LAWS should permanently be banned and their deployment should be restricted as machines can never develop the level of empathy which humans possess because machines are inherently not capable of such emotions.

To this end, HRW and the UN, as well as countries like Pakistan are against the development of LAWS and cite the Ottawa Treaty as a precedent. Moreover, the Campaign to Stop Killer Robots, another NGO, works on the legal aspects of autonomous weapons and lobbies for the complete ban on LAWS.⁵³ According to ICRC, LAWS come under the legal umbrella of International Humanitarian Law (IHL); however, it needs some LAWS-specific regulations. Nick Bostrom of the Future of Humanity Institute explains the dangers of AI or LAWS by prescription:

Short-term impacts of increased openness appear mostly socially beneficial in expectation. The strategic implications of medium and long term impacts are complex. The evaluation of long-term impacts, in particular, may depend on whether the objective is to benefit the present generation or to promote a time-neutral aggregate of well-being of future generations. Some forms of openness are plausibly positive on both counts (openness about safety measures, openness about goals). Others (openness about source code, science, and possibly capability) could lead to a tightening of the competitive situation around the time of the introduction of advanced AI, increasing the probability that winning the AI race is incompatible with using any safety method that incurs a delay or limits performance.⁵⁴

⁵² Rupert Ticehurst, “The Martens Clause and the Laws of Armed Conflict,” *International Review of the Red Cross*, no. 317 (1997),
<https://www.icrc.org/eng/resources/documents/article/other/57jnhy.htm>.

⁵³ “Call to Action,” *Campaign to Stop Killer Robots*, accessed January 10, 2018,
<https://www.stopkillerrobots.org/call-to-action/>.

⁵⁴ Nick Bostrom, *Strategic Implications of Openness in AI Development*, report no. 2016-1 (Oxford: Future of Humanity Institute, 2016),
<https://www.fhi.ox.ac.uk/wp-content/uploads/openness.pdf>.

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In his report and subsequently published paper, he discusses that in terms of policy implications, openness in AI development (such as sharing source codes or algorithms) has complex tradeoffs. Bostrom argues that:

A central concern is that openness could exacerbate a racing dynamic: competitors trying to be the first to develop advanced (superintelligent) AI may accept higher levels of existential risk in order to accelerate progress.⁵⁵

Political Aspects

According to Christof Heyns, the UN's former Special Rapporteur on Lethal Autonomous Robotics (LARs):

The Human Rights Council should call on states to stop the testing, development, production and transfer of LARs.⁵⁶

He is of the opinion that LARs can also be hacked like other computer systems and, in that case, it would be impossible to measure or determine who should be held responsible for the damage as it would not be clear who was controlling the machine. Furthermore, the idea of 'risk-less' war is not going to make the world more peaceful. On the contrary, proponents of LAWS put forward many assertions as to why their development is inevitable. The most repeated argument is the deployment of drones by the USA in Afghanistan. As the public is becoming wary of conflicts, nations are becoming reluctant by the day to send their men and women to conflict zones for peace-building or other purposes. Moreover, troops are often being accused of war crimes, such as rape and sexual assault⁵⁷ - LAWS cannot commit these unlawful acts. Therefore, such

⁵⁵ Nick Bostrom, "Strategic Implications of Openness in AI Development," *Global Policy* 8, no. 2 (2017), <http://onlinelibrary.wiley.com/doi/10.1111/1758-5899.12403/full>.

⁵⁶ Christof Heyns, *Report of the Special Rapporteur on Extrajudicial, Summary or Arbitrary Executions* (Geneva: Human Rights Council, 2013), 21, http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session23/A-HRC-23-47_en.pdf.

⁵⁷ Elizabeth F. Defeis, "U.N. Peacekeepers and Sexual Abuse and Exploitation: An End to Impunity," *Washington University Global Studies Law Review* 7, no. 2 (2008): 1, http://openscholarship.wustl.edu/cgi/viewcontent.cgi?article=1109&context=law_global_studies.

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systems are being considered a mature technology, waiting for their final development in AI.

Security Debate

The most commonly cited security concerns are that these weapons have the potential to escalate the pace of warfare and the likelihood of resorting to war, in large part due to the promise of significantly reduced military casualties. They ignite and foster arms races. These LAWS can be acquired and used by non-state armed groups, including terrorist entities and rogue states. They undermine existing warfare law, controls and regulations. Unlike nuclear weapons, LAWS require no specific hard-to-create materials and will be difficult to monitor. It is predicted that because of their easy availability, in the future ‘autonomous weapons will become the Kalashnikovs of tomorrow.’ According to Peter Singer, ‘the future of war is robotic because the present of war is robotic.’⁵⁸

Two cases highlight the present reality of mechanical technology-robotics in war. First, ‘in the Libyan Civil War, a private contractual worker gave drone support to the agitator armed force utilising off-the-rack non-military drones.’⁵⁹ Second, in the war on the Islamic State (IS), semi-autonomous weapons like drones have been used by Russia, Iraq, US, Iran, Turkey, and Syria.⁶⁰ Resultantly, the development of LAWS would automatically lead to advancements in asymmetric warfare owing to obvious advantages to the user. Experts believe that a device known as a ‘bump stock’ was used in the Las Vegas shooting.⁶¹ This device modifies a semi-automatic weapon to fire at an automatic rate,⁶² similar to

⁵⁸ Peter Bergen and Peter Singer, “Machines that Kill: Will We Rely on Autonomous Weapons?” 50:54 (31:25), YouTube video, March 2, 2015.

⁵⁹ Ibid., 31:36.

⁶⁰ Ibid., 31:54.

⁶¹ Editor’s Note: A gunman opened fire on the crowd at a music festival on Oct. 1, 2017, killing at least 58 in the deadliest mass shooting in modern US history.

⁶² Mathew Weaver, Naaman Zhou, Sam Levin and Alan Yuhas, “Names of Las Vegas Victims Emerge as Police Reveal Gun Stockpile – As it Happened,” *Guardian*, last modified October 4, 2017, <https://www.theguardian.com/us-news/live/2017/oct/02/las-vegas-two-dead-in-mandalay-bay-casino-shooting-latest->

a machine gun. It has been shown that ‘bump stocks accelerate the rate of semiautomatic weapons up to 700 rounds per minute. At least 12 of the devices were used in Las Vegas to fire 1,100 rounds in less than 10 minutes.’⁶³

Economic Debate

Contrasting aggregate expenses of army troops to robots is hard. There are several general patterns. In 2012, the Pentagon’s Under Secretary Robert Hale shared that an average soldier in Afghanistan costs USD 850,000 per year.⁶⁴ In 2012, the Military Retirement Fund paid an aggregate of USD 51.7 billion a year to a soldier.⁶⁵ This cost would lessen for any military power that replaces people with robots. In 2002, the cost to select and prepare a Marine was USD 44,887.⁶⁶ This cost speaks to the price point for obtaining LAWS that would specifically supplant people in military power. In this regard, an exhaustive report looking at the value contrasts between a robot and human may heavily tilt the discussion in favour of LAWS. Military workforce have enrollment, training, pay, recompenses, lodging, and medical costs which collect on a yearly basis. Once a trooper leaves the military, there is a potential cost of handicap as well as retirement pay. On the off chance that the officer’s life is lost, there are internment, protection, and stipend installments due as well. The main costs that exchange over in case of inducting LAWS would be introductory preparation (production), nourishing (gas or electric power),

updates?CMP=share_btn_fb&page=with%3Ablock-59d364ede4b00d657809d314#block-59d364ede4b00d657809d314.

⁶³ Gary Martin, “Las Vegas Strip Shooting Survivor-Urges Senate to Ban Bump Stocks,” *Las Vegas Review-Journal*, December 6, 2017, <https://www.reviewjournal.com/crime/shootings/las-vegas-strip-shooting-survivor-urges-senate-to-ban-bump-stocks/>.

⁶⁴ Larry Shaughnessy, “One Soldier, One Year: \$850,000 and Rising,” *CNN Security Clearance Blog*, February 28, 2012, <http://security.blogs.cnn.com/2012/02/28/one-soldier-one-year-850000-and-rising/>.

⁶⁵ CBO, *Costs of Military Pay and Benefits in the Defense Budget*, report (Washington, D.C.: Congressional Budget Office, 2012), <https://www.cbo.gov/sites/default/files/112th-congress-2011-2012/reports/43574-militarycompensationone-col.pdf>.

⁶⁶ Diana Olick, “An Army of One Carries a High Price,” *NBC News*, October 21, 2002, <http://www.nbcnews.com/id/3072945/t/army-one-carries-high-price/#.WkTVSNKWYs4>.

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and medical (support). Robots additionally have high expenditures in innovative works for improvements that do not make a difference to a human fighter. A thorough research in the expenses, in this sense, would help in understanding real time opportunity cost for exchanging robots with humans.

LAWS: Where do India and Pakistan Stand?

While the above discussion has primarily looked at the North, it is also important to see how Research and Development into LAWS or their potential deployment and use can and will impact the only two nuclear countries of South Asia, namely India and Pakistan. This is important given their age-old conflictual relationship.

India's Position

India is trying to develop autonomous weapons while advocating for comprehensive international regulations. There are many justifications being given by Indians for the development of LAWS. It is usually argued that because of the security dilemma in South Asia and India's security needs, autonomous weapons can help the military establishment in many areas, from border management to protecting vulnerable assets.⁶⁷ In this sense, according to them, a ban on LAWS is not needed at the moment as their utilisation is not fully operational yet. Instead of this, India should work and lobby for the development, transfer and deployment of these weapons.⁶⁸

According to the proponents of this technology, India must also obtain its due share of this technology if it wants to stand with future super powers. Nevertheless, Indian proponents also divulge their concerns regarding the possibility of proliferation of automated technology to non-state actors. However, it is likely that the country will want to develop this technology before international regulations get established. According to a paper 'India and the Challenge of Autonomous Weapons' by Shashank

⁶⁷ R. Shashank Reddy, "India and the Challenge of Autonomous Weapons" (paper, Carnegie India, New Delhi, 2016), <http://carnegieindia.org/2016/06/22/india-and-challenge-of-autonomous-weapons-pub-63856>.

⁶⁸ Ibid.

Reddy, the introduction of autonomous weapons will significantly change the idea of war and will likewise influence the interpretation of laws of war. As indicated by the paper, while India aspires to take a lead in the worldwide discourse about this issue, it also seeks utilisation of autonomous weapons in accordance with its security needs and national interests. Indian moves towards LAWS would compel other regional states to follow suit. Therefore, Indian policymakers think that New Delhi should not miss the opportunity and work for the development and use of autonomous weapons technology.⁶⁹

Pakistan's Position

Pakistan's stance, as far as the development of LAWS is concerned, is very clear and straightforward. Not only does it call for a complete ban on autonomous technology but also states that 'LAWS are by nature unethical,' and irrespective of the degree of sophistication, they 'cannot be programmed to comply with International Humanitarian Law.'⁷⁰ It has expressed that LAWS will 'bring down the limit of going to war' and create a responsibility vacuum. Such weapon systems would deny soldiers the assurance of international law and would likewise chance the lives of noncombatants:

Pakistan has argued for a legally restricting CCW convention that preemptively bans the advancement and utilisation of such weapons.⁷¹

Though there are a very small number of autonomous weapon systems so far, the technology would soon be possible making military action easier for some countries and thus (potentially) leading to more violence. Pakistan advocates the ban on autonomous weapons believing that they pose challenges to IHL. It was the first country to call for a ban on LAWS and is the most active proponent of a preemptive ban concluded

⁶⁹ Ibid.

⁷⁰ Ibid.

⁷¹ UNOG, *Report of the 2016 Informal Meeting of Experts on Lethal Autonomous Weapons Systems (LAWS)* (Geneva: United Nations Office at Geneva, 2016), [https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/DDC13B243BA863E6C1257FDB00380A88/\\$file/ReportLAWS_2016_AdvancedVersion.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/DDC13B243BA863E6C1257FDB00380A88/$file/ReportLAWS_2016_AdvancedVersion.pdf).

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at the CCW. Pakistan is also the first Non-Aligned Movement (NAM) group member which served as a CCW Review Conference (RevCon) president. Pakistan's disarmament representative Ambassador Tehmina Janjua presided over the CCW's Fifth RevCon in December 2016, where states supported the ban. In 2017, the Sri Lankan Government also supported the establishment of a Group of Governmental Experts (GGE) on LAWS and to elevate the dialogue on LAWS to a state-driven formal process. Argentina, China and Peru have also agreed to ban the weapons.⁷² Pakistan considers LAWS one of the most lethal weapons owing to the prospects of its up-gradation to an autonomous system. Regarding it unethical, the Government is of the assertion that in the fog of war, LAWS could prove the most inhumane weapon. This is why it has demanded that at least definitional clarity must be outlined so that the standards of International Human Rights Law (IHRL) could be maintained by making war time decisions limited to human judgement.

Options for Pakistan

The correct way in which LAWS will be utilised remains hazy. Pakistan, along these lines, is right in requesting thorough debates about their utilisation and place inside IHL. Nonetheless, a significant number of these advancements exist today and will probably be utilised as part of the war zones of tomorrow, with or without human intercession. The Government of Pakistan, therefore, needs to remain abreast of current LAWS technologies. In this regard, the usefulness of LAWS in functions such as targeting, surveillance, and damage assessment, will remain unchanged. Automation of these functions will also provide significant advantage to a party and it is essential that countries like Pakistan aggressively pursue research and development into autonomous systems. The convenience of LAWS in alternate capacities, for example, focusing on reconnaissance and damage evaluation, will stay unaltered. Mechanisation of these capacities will, likewise, give a critical favourable

⁷² Tehmina Janjua, "Statement by Ambassador Tehmina Janjua for the Fifth Review Conference" (speech, Geneva: United Nations Office at Geneva, 2016), [https://www.unog.ch/80256EDD006B8954/\(httpAssets\)/2310C0EC5A3E487BC125808E00365D35/\\$file/President's+Concluding+Remarks-CCW+++RevCon.pdf](https://www.unog.ch/80256EDD006B8954/(httpAssets)/2310C0EC5A3E487BC125808E00365D35/$file/President's+Concluding+Remarks-CCW+++RevCon.pdf).

position to a state, so nations like Pakistan should seek out innovation into autonomous frameworks.

Given Pakistan's defence policy and its unique security situation in the region, it should keep its options open as far as the development of these weapons is concerned as the induction of LAWS seems inevitable in the military strategy of major international players. With the advancement of LAWS technology, there are various potential influencers on worldwide events and foreign policy decisions. As LAWS are observed to be more averse to commit an error during conflicts, the international community is likely to keep on developing these weapons unless and until the UN takes robust action against it. In this scenario, Pakistan should be pragmatic in choosing sides.

National security perceptions will also change with LAWS becoming a reality; and international human rights organisations may also be more prone to tilt towards the development of LAWS for humanitarian purposes whether Pakistan is a part of this technological development race or not. Additionally, with the possibility of research to merge LAWS with undersea, surface ships, UGVs, drones, and cyber technologies, keeping an eye on this upcoming battlefield is a need of the hour for Pakistan.

Conclusion

It is difficult to conceptualise how dangerous LAWS will be but machines are already a part of today's military operations. In the near future, these machines will be more autonomous, opening up new possibilities for decision-makers. It is more than likely that with the transformation of today's war machines to fully autonomous ones, decision-makers may become more prone to the use of force. Therefore, answers to critical moral and ethical questions must be demanded before letting anyone develop fully autonomous weapon systems. These questions should include reviewing the prospects of change in military doctrines in accordance with the development of LAWS. Moreover, politicians should demand more research into the plausible ramifications of the deployment of LAWS. Militaries should consider the impact on civilians of deploying LAWS in the battlefield. No doubt, LAWS can serve humanitarian purposes; nevertheless, there should be guarantees that these technologies

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would not be transferred from humanitarian work to military purposes. For this, a comprehensive global consensus is needed.

In international affairs, states pursue their self-interest only. Despite international law, countries continue to develop nuclear weapons to achieve their security, political and military objectives. Similarly, LAWS present major states with an upper hand in warfare, so they will continue to develop them. Similarly, Pakistan cannot ignore LAWS becoming a reality and should work towards understanding this technology, even if it does not fully develop and subsequently operationalise these weapons. One must remain mindful of the Melian Dialogue between Spartans and Athenians during the Peloponnesian War, ‘the strong do what they can and the weak suffer what they must.’ ■