LAGOS MODEL UNITED NATIONS '22

BACKGROUND GUIDE

General Assembly First Committee (GA1)

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Background Guide: General Assembly First Committee (GA1)

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LMUN 2022: The Seventh Session

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Letter from USG

Dear delegates,

With great pleasure, I welcome you to the Lagos Model United Nations 2022, the 7th session. LMUN is a platform that highlights contemporary world issues. It brings together youths from different walks of life to deliberate on viable solutions to make the world a better place. The conference helps participants develop and improve their writing, research, public speaking, leadership, networking and diplomatic skills. LMUN refines and polishes the very best qualities in us, and I have no doubts that this conference will be a transformative process for all participants.

This year, the staff for the General Assembly (GA) First Committee are **Gloria Oziohu Alonge** (Under-Secretary-General), **Esther Adeola Amusan** (Chair), **Victoria Ayandele** (Vice-Chair), **Balqis Salako** (Researcher) and **Ivuoma Esther Nnadozie** (Researcher).

Gloria is a 4th-year law student at the University of Lagos. She has served as a delegate in several MUNs, including LMUN 2019 as the delegate of Algeria in ECOSOC and MYMUN in 2020 as the delegate of Egypt in GA 6, where she was awarded the Best Delegate Award. She has also served in official capacities as a Chair for WHO in MYI-MUN 2020 and as a Researcher for the UNHCR in LMUN 2021. She believes that MUNs are essential in the sensitization of youths on global issues and the development of problem-solving skills. She is passionate about diplomatic relations, human rights and the attainment of the SDGs. **Esther** is a 4th-year law student at the University of Lagos who is passionate about MUNs. She started her MUN journey in 2019 at LMUN where she served as the delegate of Chile to UN Women. Her passion for MUNs has grown over time as she has served in different capacities in other MUNs like YISMUN and GIMUN. Her relationship with MUNs has involved both substance and non-substance work. She is particularly drawn to the competitive debates, rigorous research

and realistic diplomacy the MUNs offer. **Victoria** is a 3rd-year law student at the University of Lagos. She has participated in 5 MUNs, some of which are LMUN'20 where she was awarded the Distinguished Delegate Award and in LMUN'21 where she won the Position Paper and Honorable Mention Award. Her interest in LMUN stems from her passion for Human Rights issues and making a positive impact. **Balqis** is a 3rd-year student of the University of Lagos who is passionate about MUNs. She was a delegate in the GA1 in LMUN'20. She also participated in LMUN'21, where she won the position paper and outstanding delegate award. **Ivuoma** is a 2nd-year student at the University of Lagos. She was a delegate of Switzerland at LMUN'21, where she received the Position Paper award.

The GA 1 deals with issues on disarmament and international security and is the only Main Committee of the General Assembly entitled to verbatim records coverage. The topics to be discussed by the Committee are:

1. Countering the Threat of Improvised Explosive Devices, Land Mines, Cluster Munitions and other Explosives.
2. The Role of Science and Technology in the Context of International Security and Disarmament

The background guide is to serve as a stepping stone to begin research on the topics to be discussed and not as a replacement for individual research. As such, delegates are encouraged to conduct their research beyond the background guides and make use of the Further Research, Annotated bibliography and Bibliography to aid in extensive research. Also, the Delegate Prep Guide and the Rules of Procedure will acquaint you with the conference's required conduct and procedural rules. These documents can be accessed on the LMUN website- www.lmun.ng. In preparation for the conference, each delegate is expected to submit a position paper on a date to be communicated after registration and country and

committee assignment. The guidelines in the LMUN Position Paper Guide will direct delegates on this process.

To communicate any questions or concerns during your preparation for the conference, please contact me at usggeneralassembly@lmun.ng or the committee at ga1@lmun.ng.

We look forward to seeing you at the LMUN 2022 Conference!

Gloria Oziohu Alonge

USG General Assembly, LMUN 2022.

List Of Abbreviations

AI	Artificial Intelligence
API	Additional Protocol I
ASAN	Association of Southeast Asian Nations
CCM	Convention on Cluster Munitions
CARICOM	Caribbean Community
CEWARN	Conflict Early Warning and Response Mechanism
DISEC	Disarmament and International Security Committee
ERW	Explosive Remnants of War
EU	European Union
GA	General Assembly
GICHD	Geneva International Centre for Humanitarian Demining
GPS	Global Positioning System
HIPPO	High-Level Independent Panel on Peace Operations
HLPD	High-Level Policy Dialogue
ICAN	International Campaign to Abolish Nuclear Weapons
ICJ	International Court of Justice
ICL	International Criminal Law
ICRC	International Committee of the Red-Cross
ICT	Information Communication Technology
IED	Improvised Explosive Device
IEDD	Improvised Explosive Device Disposal
IHL	International Humanitarian Law
IT	Information Technology
INTERPOL	International Criminal Police Organisation

LAWS	Lethal Autonomous Weapons Systems
LITTE	Liberation Tigers of Tamil Eelam
NATO	North Atlantic Treaty Organisations
OSCE	Organisation for Security and Co-operation in Europe
PGA	President of the General Assembly
PTSD	Post-Traumatic Stress Disorder
SDGs	Sustainable Development Goals
SFW	Sensor Fuzed Weapons
SIPRI	Stockholm International Peace Research Institute
UAVs	Unmanned Aerial Vehicles
UN	United Nations
UCVs	Unmanned Combat Vehicles
UCAV	Unmanned Combat Aerial Vehicles
UNDP	United Nations Development Programme
UNDC	United Nations Disarmament Committee
UNIDIR	United Nations Institute for Disarmament Research
UNMAS	United Nations Mine Action Service
UNOAU	United Nations Office to the African Union
UNODA	United Nations Office for Disarmament Affairs
UNODC	United Nations Office on Drugs & Crime
WMD	Weapons of Mass Destruction
WSIS	World Summit on the Information Society

Committee Overview

Introduction

The United Nations General Assembly First Committee, also referred to as Disarmament and International Security Committee (DISEC) or General Assembly 1, is one of the six main general assembly committees of the United Nations. It was established in 1993 to deal with and proffer solutions to disarmament matters, issues threatening international security, and global peace.[1]

The First Committee is the only general Assembly committee with access to verbatim records coverage. The committee works closely with the United Nations Disarmament Committee (UNDC) and the Geneva-based Conference on Disarmament. Historically, the UN General Assembly has passed resolutions on critical treaties governing weapons of Mass Destruction and Conventional Arms Control. The first resolution was co-sponsored by all Member States as all members are entitled to equal voice and voting rights in matters relating to international security and disarmament.

The committee's role is contained in Article 11, Chapter IV of the United Nations Charter.[2] It states that the committee may discuss any questions relating to the maintenance of international peace and security brought before it and may make recommendations regarding such questions. It also states that the General Assembly may call the Security Council's attention to situations that are likely to endanger international peace and security.

[1] UN General Assembly First Committee, (Disarmament and International Security).
[2] Charter of the United Nations, Chapter IV: Functions and Powers of the General Assembly.

Governance, Structure, and Membership

As stipulated by the United Nations Charter, the General Assembly consists of all 193 members of the United Nations, each with voting rights and two non-members as Observers; the State of Palestine and Holy See without voting status.[3] In the General Assembly, all member states have one equal voting right. However, a two-thirds majority is required for important decisions involving maintaining international peace and security, suspension and expulsion of deviant members, and financial issues. Most of the resolutions passed by the General Assembly are passed without a vote, highlighting its consensus-based nature.[4]

The First Committee works closely with the United Nations Disarmament Commission and the Geneva-based Conference on Disarmament.[5] The Conference on Disarmament performs a critical role in addressing disarmament challenges and negotiations in international treaty talks such as the Non-Proliferation Treaty. At the same time, the UNDC is a subsidiary organ of the First Committee made up of all 193 Member States responsible for making recommendations to the General Assembly. This led to the formulation of principles and guidelines subsequently endorsed by the committee in its reports. The United Nations Disarmament Commission and the Geneva-based Conference on Disarmament both report to the First Committee annually or more frequently.

The General Committee, the United Nations Office of Disarmament Affairs (UNODA), and the Department of General Assembly and Conference Management provide material and organisational support to the First Committee. The General Assembly (GA) holds an annual General Debate from September to December in the New York headquarters. It mobilises

[3] United Nations General Assembly First Committee, (Disarmament and International Security).
[4] *ibid*.
[5] United General Assembly First Committee, (Disarmament and International Security).

special sessions at other times to address a range of issues.[6] The First Committee Resolutions passed are usually consented to by a simple majority.

The governance of the GA changes with each annual session. It is made up of the President of The General Assembly (PGA), the 21 Vice-Presidents of the General Assembly, and the Chairpersons of all six Main Committees of the General Assembly. The five permanent members of the Security Council also serve as Vice-Presidents.[7]

The PGA is elected by a simple majority vote of the GA at least three months before formally assuming office at the opening of the GA session, usually in mid-June.[8] The current President at the 76th session is Abdulla Sahid, and he is empowered to administer the General Assembly Rules of Procedure but cannot take part in any decision-making of the GA. The 21 Vice-Presidents for the next session are elected on the day of the election of the PGA.[9] The Vice-Presidents replace the President of the General Assembly in the event of absence as Acting President.[10] The Acting President has the same powers and duties as the President and is under the authority of the General Assembly.[11]

Mandate, Functions and Power

Under the UN Charter,[12] the powers and functions of the General Assembly are wide-ranging but well-defined. The General Assembly First Committee, otherwise known as Disarmament and International Security (DISEC), deals with disarmament, global challenges and threats to peace that affect the international community and seek solutions to the challenges in the international security regime.

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[6] United Nations General Assembly.
[7] United Nation General Assembly, Rules of Procedures, President and Vice-President.
[8] *ibid*.
[9] *ibid*.
[10] *ibid*.
[11] *ibid*.
[12] The United Nations charter of 1945.

It considers all disarmament and international security matters within the scope of the Charter or relating to the powers and functions of any other organ of the United Nations; the general principles of cooperation in the maintenance of international peace and security, as well as principles governing disarmament and the regulation of armaments; promotion of cooperative arrangements and measures aimed at strengthening stability through lower levels of armaments.[13]

The Committee[14] works closely with the United Nations Disarmament Commission and the Geneva-based Conference on Disarmament. It is the only Main Committee of the General Assembly entitled to verbatim records coverage. According to the Charter, its primary functions include governing and regulating issues relating to armament or disarmament, as well as bringing the attention of the security council to any threats to international peace or security. In other words, The First Committee of the United Nations General Assembly debates disarmament, non-proliferation, arms control, and global security issues, recommending resolutions and decisions for adoption by the plenary session of the UNGA.

Recent Sessions, Current Priorities

After 2020's completely virtual 75th session,[15] a historic first, the 76th session of the General Assembly in 2021 returned in person. It was opened on Tuesday, 14th of September, 2021, by the President of the General Assembly, Abdullah Shahid of the Maldives, in New York City, United States, with the theme "Building Resilience through hope to recover from COVID-19, rebuild sustainably, respond to the needs of the planet, respect the rights of people, and revitalise the United Nations."

[13] Article 11 of the United Nations Charter.
[14] The United Nations General Assembly First Committee.
[15] The 75th session of the United Nations General Assembly (2020).

The committee, known informally as the world's "town hall", is where all 193 UN Member States have a voice. Thus, at its recent sessions, the committee has continued to unanimously condemn all acts of terror that threaten the peace and security of any nation.

The committee has intervened in and condemned acts such as the Russian invasion of Ukraine, where the committee came to a resolution during a special emergency session which demanded that Russia immediately and completely remove all her military forces from the territory of Ukraine. Commenting on the invasion and reinforcing the General Assembly's stance, the UN Secretary-General Antonio Guterres said, "The message of the General Assembly is loud and clear: end hostilities in Ukraine now. Silence the guns now. Open the door to dialogue and diplomacy now."[16]

Similarly, the General Assembly has also called on Israel to account for its occupation of Palestine for more than 50 years. Several resolutions were reached by the GA regarding the situation in Palestine at the Assembly's 75th session. They include; The resolution on the rights of the Palestine people to self-determination[17] and The granting of permanent sovereignty to the people of Palestine.[18]

At its recent sessions, the Assembly has reached several other resolutions to reinforce its commitment to ensuring disarmament and eliminating all threats to peace and security. Some of these resolutions include: promoting international cooperation on peaceful uses of arms in the context of international security 76/234,[19] preventing the illicit trade in small arms and light weapons in all its aspects 76/232,[20] problems arising from the accumulation of

[16] UNGA: Special session (2022).
[17] General Assembly resolution on the rights of the Palestine people to self determination A/RES/76/150.
[18] General Assembly resolution on the permanent sovereignty for the people of Palestine A/RES/76/225.
[19] General assembly Resolution on promoting international cooperation on peaceful uses of arms in the context of international A/RES/76/234.
[20] General assembly resolution on problems arising from the illicit trade in small arms and light weapons A/RES/76/232.

conventional ammunition stockpiles in surplus 76/233,[21] reducing space threats through norms, rules, and principles of responsible behaviours 76/231[22] and practical measures for the prevention of an arms race in outer space 76/230.[23]

Conclusion

The United Nations General Assembly (First Committee) is concerned with addressing issues relating to international peace and security and promoting disarmament efforts. The committee works closely with subsidiary organs of the Assembly, such as the United Nations Disarmament Committee (UNDC), the Geneva-based Conference on Disarmament and the UN body at large. It is committed to passing resolutions and frameworks by the Member States on international security and disarmament matters.

Annotated bibliography

Charter of the United Nations, Chapter IV, available at https://www.un.org/en/sections/un-charter/chapter-iv/index.html (accessed 15 February 2022).

> *The Charter of the United Nations is one of the most fundamental documents of the United Nations. It is a must-read for any one who wants to learn about the Disarmament and International Security Committee. The Charter informs one about the Structure, Powers and Functions of the General Assembly and other Committees. Information and facts retrieved from the site will aid better understanding for Delegates.*

[21] General assembly resolution on problems arising from the accumulation of conventional ammunition stockpiles in surplus A/RES/76/233.
[22] General assembly resolution on reducing space threats through norms,rules and principles of responsible behaviours A/RES/76/231.
[23] General assembly resolution on further practical principles for the prevention of arms race in outer space A/RES/76/230.

United Nations, General Assembly, First Committee Security (Disarmament and International), available at http://www.un.org/en/ga/first/ (accessed 15 February 2022).

This website contains all the relevant information regarding the First Committee. It provides an overview of the First Committee's work and structure. It also highlights the Committee's relationship with other UN bodies and stakeholders. This is a useful source of information for delegates who wish to understand the mandate and functions of the First Committee critically.

United Nations, General Assembly, Rules of Procedure, available at https://www.un.org/en/ga/about/ropga/prez.shtml (accessed 15 February 2022).

This is a useful source of information about the operation of the General Assembly First Committee. It provides insight into the structure of the Committee, the operation of its sessions, its governance and its working methods.

UN General Assembly, Disarmament and International Security (First Committee), available at https://www.un.org/en/ga/first/index.shtml (accessed 15 February 2022).

This website provides an insight into the mandate of the General Assembly committee, how the sessions are structured and their working methods. It also contains landmark resolutions and documents, which will prove helpful to anyone researching about and wishes to have an insight into the previous actions of the Committee.

The very first general assembly resolution that was co-sponsored by all Member States at that time: resolutions adopted on the reports of the first Committee available at https://documents-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/142/01/PDF/NR014201.pdf?OpenElement (accessed 15 February 2022).

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Charter of the United Nations, Chapter IV, available at https://www.un.org/en/sections/un-charter/chapter-iv/index.html (accessed 15 February 2022).

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United Nations, General Assembly, available at https://www.un.org/en/ga/ (accessed 15 February 2022).

UN General Assembly First Committee, (Disarmament and International Security), available at https://www.un.org/en/ga/first/index.shtml (accessed 15 February 2022).

UN General Assembly, Rules of Procedure, President and Vice-Presidents, available at https://www.un.org/en/ga/about/ropga/prez.shtml (accessed 15 February 2022).

UN General Assembly, Bureau of the 76th Session, First Committee (Disarmament and International Security), available at https://www.un.org/en/ga/first/76/bureau76.shtml (accessed 15 February 2022).

Countering The Threat Of Improvised Explosive Devices, Land Mines, Cluster Munitions And Other Explosives.

The evolving nature of explosive devices and their use requires us to constantly update our situational awareness and adapt our pre-deployment and in-mission training.

-António Guterres (Current Secretary-General of the United Nations)

Introduction

The United Nations, through the United Nations Office for Disarmament affairs,[24] defines an IED (Improvised Explosive Device) as "A device placed or fabricated in an improvised manner incorporating explosive material, destructive, lethal, noxious, incendiary, pyrotechnic materials or chemicals designed to destroy, disfigure, distract or harass which may incorporate military stores, but are normally devised from a non-military component."

A landmine is an explosive device designed to destroy or damage vehicles, wound, kill, or otherwise restrict people's activities.Mines can be victim-activated, detonated by the action of their target by being stepped on or struck or triggered by direct pressure, tripwires, tilt rods, command detonations or by some combination of these methods.[25]

According to the ICRC, a cluster munition is a form of air-dropped or ground-launched explosive weapon that releases or ejects smaller submunitions.[26] Commonly, this is a cluster bomb that ejects explosive bomblets that are designed to kill personnel and destroy vehicles. Other cluster munitions are designed to destroy runways or electric power transmission lines, disperse chemical or biological weapons, or scatter land mines. Some sub-munition-based weapons can disperse non-munitions, such as leaflets.

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[24] United Nations office for Disarmament affairs: Agenda for Disarmament 2018.
[25] GICHD - guide to mine action (2014).
[26] The International committee of the red cross: official handbook.

While the IED is sometimes described as a new technology, it has a lengthy history. Ships loaded with explosives were used as far back as the 1500s, while various jury-rigged bombs and mines were used in various civil wars, such as at the naval battle of Mobile Bay and the land battle of Petersburg. The "new" version of IEDs, whose explosively formed penetrators can pierce even the armour plating of the U.S. military's mine-resistant vehicles, dates back to World War II.[27]

But in the past, the use of such weapons was limited and certainly without strategic consequences. The name "improvised" was originally meant as a sort of put-down. An IED was only used when it was extremely needed, majorly for defence, not something to be widely emulated or used extensively. The origin of Landmines could also be dated back to the American Civil War.[28] Precursors of the weapon are said to have first been used in the American Civil War in the 1800s.

Nevertheless, anti-personnel mines were first used on a wide scale in World War II. Landmines were originally designed to maim rather than kill an enemy soldier. They were used defensively to protect strategic areas such as borders, camps, or important bridges and restrict opposing forces' movement.

However, with each passing day, explosives like the IED and Landmines are becoming more of a weapon for terrorist actions or an instrument used in unconventional asymmetric warfare by insurgent guerrillas. In the Iraq War (2003–2011), insurgents used IEDs extensively against U.S.-led forces and by the end of 2007, IEDs were responsible for approximately 63% of coalition deaths in Iraq.[29] They were also used in Afghanistan by insurgent groups and have caused over 66% of coalition casualties in the 2001–2021 Afghanistan War. IEDs were also used frequently by the Liberation Tigers of Tamil Eelam (LTTE) in Sri Lanka during the Sri Lankan

[27] The second World War (1939 - 1945).
[28] The United States civil war (1861 - 1865).
[29] United Nations Mine Action Service (UNMAS) ; A focus on IEDs.

Civil War.[30] Similarly, landmines have been used in many conflicts, including in the Vietnam War, the Korean War, and the first Gulf War.

Technological advancements, the industrial revolution, and the discovery of explosives have kept man in fear of destruction. This is because destructions caused by improvised explosives are far-reaching, causing death, physical injuries, and loss of infrastructure & property. Despite its danger and manifold implications, the IEDs have proved to be a cheap, relatively easy-to-use tool in times of warfare and for terrorist actions, thus leading to its continuous proliferation.

International and Regional Frameworks

International efforts have also gone a long way to regulate Improvised Explosive Devices. The *UN Mine Action Service (UNMAS)*[31] served as the United Nations focal point for mine action. The North Atlantic Treaty Organisation (NATO)[32] and the United Nations (UN) have shown efforts toward maintaining international peace & security. The United Nations General Assembly and Security Council, in particular, have continually reinforced their commitments to countering the threats caused by IEDs. They have done so through resolutions such as *The General Assembly resolution 71/72*[33] *and 63/85*[34] *and the Security Council resolution 2365 (2017).*[35] These resolutions expressed concern over the high number of civilian casualties caused by landmines, explosive war remnants and improvised explosive devices. The General Assembly reiterated its call on belligerents to "immediately and definitively" end the indiscriminate use of such weapons. It likewise stressed the need to enhance measures to

[30] The Sri lankan War (1983 - 2009).
[31] United Nations Mine Action Service : landmines,ERW and IED safety handbook.
[32] North Atlantic Treaty Organisation - guidelines for mine action.
[33] General Assembly resolution on countering the threats posed by improvised explosive devices A/Res/71/72.
[34] General Assembly resolution prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects A/Res/63/85.
[35] Security Council resolution on mine action (2017).

combat the illicit procurement of components, explosives, and materials for the construction of improvised explosive devices.

In addition to this, *The Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices,* as amended on 3 May 1996 (Amended Protocol II), strengthened existing rules on the use of mines, booby traps and other devices. It contains rules which regulate but do not ban the use of landmines, booby-traps and other explosive devices.[36] However, the failure of the High Contracting Parties to reach a consensus on a total prohibition of anti-personnel landmines at the time resulted in the negotiation and subsequent adoption of the *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction(the Ottawa Convention).*

The *Ottawa Convention*,[37] also known as the *Anti-Personnel Mine Ban Treaty of 1997,* called for an International Total Ban on Anti-Personnel Landmines and encouraged further international efforts to seek solutions to the problems caused by anti-personnel-mines, with a view to their eventual elimination. Currently, 164 states are party to this treaty.

The Convention on Cluster Munitions (CCM) is a legal Instrument developed to address humanitarian issues; the plight of those faced with explosives. It is a response to the suffering caused by cluster munitions, which killed and injured thousands of civilians in countries where they had been used. Cluster munitions pose a threat to civilians when sub-munitions are randomly dispersed over a vast area. Hence, the importance of this Convention is that the CCM prohibits under any circumstances the use, development, production, acquisition, stockpiling & transfer of cluster munitions, as well as the assistance of anyone to engage in

[36] Article 3-7 of the amended protocol on prohibitions or restrictions on the use of mines, booby traps and other devices (1996).
[37] Article 1 of the Ottawa Convention (1997).

prohibited activities.[38] The Convention came into place in May 2008, and 107 states concluded an international treaty prohibiting these weapons. It explicitly prohibits under any circumstances the use, development, production, acquisition, stockpiling and transfer of cluster munitions, as well as the assistance or encouragement of anyone to engage in prohibited activities.

Other noteworthy regional instruments include; *The European Convention on the Suppression of Terrorism* which aims to prevent the acquisition of explosives for terrorist acts, and the *Euratom Treaty,* which came into place to ensure IEDs and other Nuclear energy are not used indiscriminately.

The Role of International Systems

The United Nations working toward long-lasting peace, established the United Nations Mine Action Service (UNMAS) in 1997. The UNMAS was established to eradicate the danger posed by mines, explosive remnants of war, improvised explosive devices, and cluster munitions. This was done in line with the UN's vision of a "World free of the threat of landmines & unexploded ordnance, where individuals and communities live in a safe environment conducive to development & where survivors are fully integrated into their societies."[39]

The UNMAS is a specialised service of the United Nations under the United Nations Department of Peacekeeping Operations.[40] This service collaborates with 12 other UN departments, agencies, services, and programs to ensure a safe environment for all. Due to the reality that the UNMAS is within the Department of Peace Operations, it operates under

[38] Article 1 - 9 of the convention on cluster munitions (2008).
[39] UNHCR, "Mine Action Operational Framework."
[40] UNMAS, "Who we Are."

the UN legislative mandates of both the General Assembly & the United Nations Security Council. Hence, it also responds to requests for support from the UN Secretary-General.

As expressed before, the UNMAS facilitates the Inter-Agency Coordination Group on Mine Action,[41] an alliance of 12 UN offices with a similarly driven goal of ensuring a mine-free environment. To achieve this goal, the United Nations Inter-Agency Policy was created to tackle the United Nations Mine Action Service effectively.[42]

The UNMAS additionally coordinates the standing committees made when the Anti-Personnel Mine-Ban Treaty went into effect in 1999, the steering committee on Mine Action, a community of NGOs, Intergovernmental & humanitarian organisations. For proficiency, the UNMAS activities can be divided into five pillars of Mine Action: Clearance, Mine Risk Education, Victim Assistance, Advocacy, and Stockpile Destruction.[43]

The work of the UNMAS does not stop at coordinating UN offices. It also extends to providing supplies through national programmes for survivors of cluster munitions and landmine attacks to cater for their needs. In 2018, the UNMAS convened, which led to the drafting of the United Nations Mine Action Strategy 2019-2023.[44] With years of experience, the UNMAS has continuously enhanced its capacities in IED awareness, risk education, and victim assistance for survivors. The UNMAS has also gone out of its way to support the effective management of IED Threat Mitigation policies & procedures.

The UN system advanced in its work in order to mitigate the threat of Improvised Explosive Devices. The UNMAS has existed for several years; they have been effective and active in their duty. As a result of the efforts of the UNMAS, in June 2011, the UN declared Nepal to be

[41] General Assembly (A/RES/72/75) and SCR 2365 (2017).
[42] E-Mine, "UN Inter-Agency Coordination Group on Mine Action (IACG-MA)."
[43] NATO Guidelines for Gender Mainstreaming in Mine Action.
[44] 5 A/74/288 General Assembly Resolution.

landmine free.[45] And subsequently, in 2020, the United Nations Mine Action Community levelled up to face the challenges of the Covid-19 pandemic.

The United Nations Institute for Disarmament Research (UNIDIR) is an intergovernmental organisation within the UN. The UNIDIR, while working with UNMAS, undertakes independent research on disarmament and associated issues, particularly international security concerns. This body of the United Nations is based in Geneva, Switzerland. It acts as a bridge between the research community and government and is funded by contributions from government and foundations.[46] While creating this body, the General Assembly acknowledged the need for objective and comprehensive research on disarmament and security. The General Assembly specified that the UNIDIR would be an autonomous institute within the UN.

The use of explosive weapons, landmines, and cluster munitions has had devastating effects on civilians. Explosive weapons also leave behind explosive remnants that threaten populations until removed. These issues led the UNIDIR to launch the Norms on Explosive Weapons Project in August 2012.[47] The objective of this project was to raise widespread awareness on the cost of using explosive weapons in populated areas to support the development of policies and practices that would reduce harm to civilians. In 2018, the Board of Trustees endorsed that the organisation's research agenda will be; Weapons of Mass Destruction & other Strategic Weapons, Conventional Arms, New Weapon Technologies, Middle East Weapons of Mass Destruction Free Zone, Gender and Disarmament.

Several International Organisations were instrumental to the achievements of the United Nations. The World Customs Organisation, alongside INTERPOL (the International Criminal

[45] ICRC, Mine Free Education.
[46] UNIDIR, "Disarmament as Humanitarian Action."
[47] UNIDIR, "Protecting Civilians from the Effects of Explosive Weapons An Analysis of International Legal and Policy Standards"- Maya Brehm.

Police Organisation) and the United Nations Office on Drugs & Crime (UNODC), made an initiative to improve the monitoring & tracking of illicit materials that can be used in manufacturing IEDs at the International level.[48] For this reason, the UNSC endorsed many resolutions recognising INTERPOL's global role in combating terrorism.

Several regional organisations have also gone the extra mile to show their support against terrorism. The Organisation for Security and Co-operation in Europe (OSCE) has been described as the world's largest regional security-oriented inter-governmental organisation.[49] One of its mandates, among others, is arms control. The OSCE has played a significant role in supporting mine action at various levels, including strengthening of norms & principles of participating states. The OSCE, with its mine action considerations, serves as a tool of mine control in terms of security-building measures for landmines and unexploded or abandoned ordnance, including improvised explosive devices. The Association of Southeast Asian Nations (ASEAN), Caribbean Community (CARICOM),[50] Organisation for Security & Cooperation in Europe (OSCE),[51] and Organisation of Islamic Cooperation (OIC) have all worked towards the strengthening of regional policies on landmines. International efforts have resulted in the declaration of the 4th of April as the International Day for Mine Awareness and Assistance in Mine Action.

For the African Union, The United Nations Office to the African Union (UNOAU) and UNMAS have boosted efforts of the AU towards actions targeted to implementing Mine Action & explosives. In April 2014, the African Union launched the Mine Action and Explosive Remnants of War Strategic Framework Project Document from 2014 to 2017.[52]

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[48] INTERPOL, "Chemical and Explosive Terrorism."
[49] OSCE, " Who We Are."
[50] CARICOM, "United Nations Security Council (UNSC) Resolution 1540.
[51] OSCE, "Countering Terrorism."
[52] Landmines/Mine Action- African Union- Peace and Security Department.

The African Union has always frowned on the use of landmines, cluster munitions & explosive remnants of war on civilians & socio-economic development, especially with the knowledge of the proliferation & widespread use in Africa. The AU has implemented various programmes toward this goal.

The threat of Improvised Explosive Devices is not new. Still, efforts are lagging today because the past international attempts to root out such damage often lacked coordination and commitment leading to the late development of laws. However, there is hope for great progress as recently, the international community, as a united front, has settled for ways to regulate this harm.

The Categorization of Improvised Explosive Devices, Landmines and Cluster Munitions

It is essential to consider the different categories of explosive weapons as a fragmented view because this will help to identify them further.

Improvised Explosive Devices have been broadly classified into the timed, command, victim-operated, and combination-initiated IEDs. The Timed initiated IED operates by a timing mechanism set by the perpetrator. It functions within the set time. This could be the interval of a hand-thrown grenade or a long delay targeting a high-profile event.[53] Some examples are a mechanical timer/ electronic timer or a burning fuse. The Command-initiated IED is controlled by the receiver, an operator who sends an impulse to trigger it.[54] Hence, it is activated through human action. It may be by command wire, radio control, or a suicide switch.[55] As the name implies, victim-initiated IEDs are activated by the victim's action. This may either be through contact (e.g. a pressure plate or tripwire) or influence (e.g. passive infrared (PIR) sensor).[56] The combination initiated is also called multi-switch as it comprises

[53] GICHD, Improvised Explosive Device Clearance Good Practice Guide 2020 Edition.
[54] Action on Armed Violence's (AOAV) IED research.
[55] *ibid*.
[56] *ibid*.

alternative firing switches. For example, a victim-operated IED equipped with a radio control that enables specific targeting and mitigates jamming). On the other hand, a single IED can also have different switches of the same type (e.g. two or more different pressure plates or multiple crush wires).[57] IEDs are improvised materials, meaning they may also be in the form of household materials such as fertilisers, gun powders, and hydrogen peroxide.

Furthermore, there are two categories of land mines; anti-personnel tanks and anti-tank landmines.[58] Anti-personnel mines draw their origin from World War I.[59] It became an essential weapon after the guerrilla wars in Asia & Africa during the second half of the 20th century. They are designed to explode when as little as two kilograms of pressure is applied. On the other hand, the anti-tank landmines usually explode when at least 200 kilograms of force is applied to them. Anti-tank mines are typically larger and contain more explosives than anti-personnel mines. This means they require more pressure to detonate.[60]

For Cluster Munitions, A 2009 publication by the Geneva International Centre for Humanitarian Demining (GICHD)[61] reviewed the types of submunitions into five categories: their means of delivery, their intended effects, their fuzing system, the presence of a target identification mechanism, and the presence of a self-destruct mechanism.[62]

When set on its target, the means of delivery of submunitions may be in the form of a: tube-launcher, aircraft dispenser, rocket/missile, and the most commonly used is air-dropped bombs as seen in the conflicts in Afghanistan, the Lao People's Democratic Republic and Cambodia.

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[57] *ibid*.
[58] United Nations, Dag Hammarskjöld Library, Ask Dag.
[59] A History of Landmines, International Campaign to Ban Landmines (ICBL).
[60] How Landmines Work, How stuff works.
[61] The Geneva International Centre for Humanitarian Demining (GICHD).
[62] A guide to Cluster Munitions, November 2007.

Several cluster munitions have various purposes hence the difference in their intended effects. However, the most common are; fragmentation, anti-armour and combined effects (anti-armour and fragmentation effects).

A fuzing system is the different ways a submunition can be opened and initiated. There are primary and secondary fuzing mechanisms in which the secondary is employed where the primary fails. Secondary fuzes serve as a backup if the primary fuze fails due to unforeseen circumstances, such as impact at the wrong angle. An example is the Unexploded US BLU-97 submunition which has a reputation for accidental initiation. However, its secondary fuze often remains functional, despite failing during the initial impact.[63]

The concept of the operating system of cluster munitions is fascinating. However, attention is usually placed on what affects humans, the targets of such mechanisms. Since most sub-munitions fall in any direction, with some even straying from their intended target, humanitarian efforts have been made towards improving their accuracy. Most anti-armour cluster munition systems now use independently targeted bomblets. Recent developments have also shown improvements in incorporating wind correction and inertia/GPS (Global Positioning System) guidance. A clear example is the US BLU-108 Sensor Fuzed Weapon (SFW), first used during combat in Iraq in 2003.

Lastly, a self-destruct mechanism automatically detonates after a set time or on impact. These mechanisms may be electronic or mechanical.

[63] GICHD, A guide to Cluster Munitions.

The Threat of Landmines, Improvised Explosive Devices and Cluster Munitions

The effort of man to protect himself during conflict situations with technology usually comes at a price. In the case of explosive weapons, the indiscriminate use of landmines, IEDs, and cluster munitions have caused death and adverse effects on many innocent civilians.

In today's world, explosive ordnance has negatively impacted many, ranging from adults to children, humans to animals, and soldiers to civilians. Statistics show that children face roughly half of the casualties from explosive weapons (54% of all civilian casualties).[64] They form a large part of the vulnerable population of those affected by explosive armaments primarily due to their ignorance and curiosity. Children are at constant risk of encountering landmines being active at their age & while doing daily chores working in fields, herding animals, fetching water, playing or going to school. A clear example of this was in Cambodia in 1994 when three young ladies were seriously harmed by mines while playing volleyball on a playing field.[65] The use of IEDs in the form of familiar household objects poses a danger to ignorant children. This is evidenced by amputations, loss of hearing, flashbacks, nightmares, poor memory, lack of concentration, and behavioural changes. Also, the presence of unexploded submunitions aggravates some of the consequences children experience during armed conflicts, such as malnutrition, famine, poverty, starvation and other social, economic and environmental implications.[66]

It is common to find short as well as long-term effects of landmines. Many who have encountered such explosions face psychological and physical effects. Regarding the physical effects, most landmine survivors usually face leg injuries or adverse health effects. Individuals who survive the explosion of submunitions are likely to have multiple blast or fragment injuries. Those who become disabled face stigmatisation from others, rejection and

[64] UNICEF, "Protecting children from explosive weapons."
[65] Save the Children, "Child Landmine Survivors: An Inclusive Approach to Policy and Practice."
[66] ICL Journal, "Consequences of Cluster Munitions on the rights of the child."

unemployment. In addition, one is likely to get an infection due to the penetration of mud, grass, pieces of clothing and metal fragments into the wounds after detonation.[67] On the psychological side, The peripheral nervous system is mainly affected, and patients suffer from significant psychosocial tribulations such as anxiety, depression, and PTSD (Post-Traumatic Stress Disorder). Cluster munitions are characterised by explosive ordnance lying on the soil surface, unlike mines hidden under the soil. One who falls victim to such is prone to be left with immense mental implications, a feeling of insecurity, decline in economic productivity of the affected community. On the other hand, a unique negative effect of landmines is that because they are embedded, there is an extension of its traumatic impact on members of a community for many years, even after peace. It is a constant reminder of bitterness, loss, suffering and painful memories among former soldiers, survivors, and citizens.

A major hindrance to socio-economic development is the presence of landmines, cluster munitions and IEDs. Such explosions disrupt daily economic activities, causing damage to infrastructure and property. Most people facing psychological trauma often end up losing economic value to society.. In Kuwait, the restoration of electrical power was delayed because of unexploded submunitions being found in critical parts of the grid. Similarly, in Serbia, the clearance and reopening of the Niš airport in 2004, years after the conflict ended, is credited with boosting economic development.[68] The threat of landmines extends beyond harm to humans but also to our environment. It is to be noted that the Explosive Remnants of War (ERW) planted in the ground or dropped from aircraft can remain in the ground for several decades and prevent access to natural resources. Landmines negatively affect soil through degradation, deforestation, pollution of natural resources with heavy metals and mutating entire species' populations by degrading habitats and altering food chains.[69] Landmines

[67] Fares & Fares (n 41), pp. 2097-2098.
[68] UNDIR, "The-Humanitarian-impact-of-Cluster-Munitions," (2008).
[69] ICBL, "Environmental Aspects of the international Crisis of Anti-personnel landmines and the implementation of the 1997 Mine Ban Treaty."

constitute a severe threat to the global ecosystems, especially landmine poaching, which is the highest distortion of this insidious weapon noted for its easy and effective mechanism for killing wildlife and domestic species. Mine clearance activities also negatively affect the soil. Mine clearance activities involve clearing vegetation, detonating large explosives, and generating hazardous waste, all of which will affect the environment if not properly managed. Furthermore, the release of toxic substances into the environment, such as mercury and lead, cannot be overlooked.

The Importance of Proper Disposal of Explosives Ordnance

It is no secret that in the course of battle or conflict, sub-munitions are usually thrown into spaces where they sometimes lay for years. Statistics show that up to 40% of sub-munitions do not explode on impact either because they are too light or the ground is too soft.[70] Hence, these shells are released mid-air into lands, and they fail to detonate immediately, leaving them to kill or maim at random even after conflicts have ended.[71] Hence, disposal is not an easy task as they could be found hanging on vegetation, roof-tops & other unusual locations.

Having established how dangerous IEDs are in their indiscriminate use, it becomes important to consider the hazardous threat they constitute if not properly disposed of. This usually has a long-term adverse effect on the environment and anyone who comes in contact with them.

Improvised Explosive Devices Disposal (IEDD) in the context of mine action can be seen as the location, identification, rendering safe & final disposal of IEDs. The United Nations designed the Improvised Explosive Device Disposal Standards for the safe disposal of IEDs. They were developed at the request of mine action stakeholders while considering the

[70] ICRC, "Cluster munitions: what are they and what is the problem?" (2010).
[71] OSCE, "Disposal of aircraft and cluster bombs, and artillery shells."

Anti-Personnel Mine Ban Convention and the Convention on Certain Conventional Weapons. These standards establish the minimum levels required for such disposal and are detailed in ways to tackle the issue of disposal. It states the steps to guide IED disposal planning, required training and the equipment used to conduct IED disposal operations, as well as the appropriate approaches to achieving clearance in rural and urban areas, information management and IED risk education. Hence, the United Nations has a duty of care to ensure those trained to dispose of such have a practical guide to safeguard their lives.

The key to proper disposal of IEDs is the employment of trained and equipped IEDD operators to dispose of these weapons. This is due to the nature, composition and functionality of IEDs. Hence, knowledge and the employment of the right equipment are important for effective disposal and ensuring the operators' safety. The method for disposing of such is that generally, in post-conflict areas, the control of IED disposal is within the jurisdiction of the national state security forces and emergency services.[72] Also, in the disposal of explosive ordnance, their acquisition, importation, transport, preservation, maintenance and disposal of all things of dangerous arms should be in accordance with national laws, public regulation and any prevalent arms bans.[73]

In summary, International bodies have taken steps to dispose of explosive ordnance. In 2019, it was said that a global total of more than 130 square kilometres was cleared of cluster munition remnants.[74] One of such places was South Sudan, where the UNMAS cleared cluster munition strike areas.[75] This exercise was also accompanied by risk education to advance safe behaviour in defiled regions, rehabilitation, and socioeconomic and psychological support to

[72] United Nation, Improvised Explosive Device Disposal Standards.
[73] *ibid*.
[74] Norwegian People's Aid, "Clearing Cluster Munition Remnants 2020; A Report by Mine Action Review for the Second Review Conference of the 2008 Convention on Cluster Munitions."
[75] *ibid*.

victims of explosive ordnance. The effective clearance of these lands enables safe & efficient use of resources. Proper disposal will also prevent further indiscriminate use by others.

Restrictions on Improvised Explosive Devices, Cluster Munitions, Land Mines and other explosives

The continued use of explosive weapons with no restrictions will lead to a state of lawlessness. Hence, The United Nations and other international bodies have taken steps to restrict IEDs to prevent anarchy and the indiscriminate loss of lives & property.

Opposition against landmines initially began in the military amidst the contention that the humanitarian expenses of landmines surpassed the military benefit.[76] This led to a global campaign in 1992 by humanitarian groups and NGOs, some of which include: Vietnam Veterans of America Foundation (VVAF), Medico International of Germany, Handicap International of France, Mines Advisory Group of Great Britain, Human Rights Watch and Physicians for Human Rights. This campaign resulted in the signing of the Mine Ban Treaty (Convention of the Prohibition of the Use, Stock-piling, Production and Transfer of Anti-Personnel Mines and on Their Destruction). With more than 80% of the world's nations signed as state parties, The Mine Ban Treaty is known to be one of the world's most generally accepted laws.[77] There are at present 164 States Parties. However, some nations are still yet to ratify this document, and the majority in this category are past and current manufacturers and landmines, including the United States, China, India, Pakistan, and Russia.[78]

[76] Bonn International Centre for Conversion, Conventional Weapons.
[77] International Campaign to Ban Landmines, Treaty Status.
[78] Arms Control Association, The Ottawa Convention: Signatories and State-Parties.

For cluster munitions, the Convention on Cluster Munitions (Oslo Convention) entered into force on 1 August 2010. It bans the use, production, exchange and storing of cluster bombs. It also requires state parties to provide victim assistance and clear contaminated areas.

The CCM has made significant headway in recent years, with almost two-thirds of UN member states in agreement. The annihilation of cluster munitions stockpiles has made a hallmark in the history of the CCM's first ten years. The Cluster Munition Monitor shows that states-parties have destroyed almost 1.5 million cluster munitions and more than 178 million submunitions. With only a few states-parties left with cluster munitions stockpiles to destroy.[79]

Governments and international and regional organisations set up a few significant drives to address IEDs. The activities of an expert group developed a compilation of rules and practices tending towards the use of materials that can be utilised as IEDs. These rules are now called the Convention on Certain Conventional Weapons. Even with the existence of multiple conventions, nations are slow in ratification. Recognising that there are a number of competing needs for legislatures, particularly with the Covid-19 pandemic, there is urgency for these signatory states to ratify these international documents at the earliest opportunity. Currently, the convention is below its goal, with 130 state parties by the second review conference.

Unfortunately, while many states already have established regulatory frameworks on commercial explosives, others have not yet done so. There has been difficulty in getting a united front on restricting the use of cluster munitions. Some states that haven't signed the convention continue to use cluster munitions. Addressing IEDs requires actions from all,

[79] Arms Control Association, Stigmatising Cluster Munitions: A Decade of Success.

ranging from governments, militaries, humanitarian, operational and other specialised agencies to industry, research organisations and advocacy groups.

The Impact of IEDs on Aid Agencies & Humanitarian Operations

In the face of the challenge of countering the threat of explosive weapons, one of the limiting factors has been the shortage of human resources in aid agencies. In the discussion of explosive weapons, the focus is mostly on civilians. So there is little research on the impacts of these on humanitarian operations.[80] IEDs are a menace to civilians. How much more those at the forefront of this menace, in tents and camps, tending to the wounds of injured victims? Ordinarily, aid providers are to be grouped as non-combatants duly protected under the Geneva Conventions of 1949[81] and the related Protocols I and II of 1977. In pursuant to this, the UN Security Council in 2003 denounced all attacks against those in humanitarian operations and called for even greater protection to show zero tolerance for such.[82] With the current situation, the UN's Inter-Agency Standing Committee shows that insecurity in humanitarian staff activities has been one of the leading causes of the shrinking humanitarian space.

Humanitarian aid is vital in reducing the impact of crises on communities, helping recovery and readiness for emergencies. The presence of humanitarian aid agencies in conflict situations is indispensable. Still, the use of IEDs have gone a long way to frustrate such efforts.

Many terrorists have used IEDs to target humanitarian agencies and individual aid workers despite the principles enshrined in international law that humanitarian activities should not be targeted in armed conflict. The targeting of aid workers by organisations such as the

[80] Chatham House, "The Impact of IEDs on the Humanitarian Space in Afghanistan."
[81] Article 9.
[82] *ibid*.

Islamic State (IS) may reflect the loss of perceived neutrality that was once the humanitarian sector's best defence.

The impact of IEDs on humanitarian organisations has a causal effect on NGOs. Over the last decade, many humanitarian workers have been killed or harmed by IEDs. This has led some NGOs to employ new methods to eliminate operational risk by focusing on building national partners, less-visible local profiles, and increasing staff security mechanisms.[83]

In Afghanistan, NGOs account for almost 30% of the casualties.[84] This highlights the challenge IEDs pose to the humanitarian sector as the principles of impartiality and neutrality are side-lined. These attacks are detrimental to surviving conflict due to the vulnerability of such aid agencies. Aid agencies and humanitarian operations are weakened by their interconnectedness. Essentially, harm to aid services will have a thumping effect on others. For instance, assuming the energy supply is cut, the water supply capacity and the clearing and treatment of wastewater out of a populated region will also be affected. Consequently, essential services are defenceless against a 'domino effect,' as harm to one service can bring down the conveyance of various services.[85]

Some organisations have taken it upon themselves to question survivors as expected by the CCM action plans. However, there has been no sign that survivors' perspectives were effectively thought of or acted upon.[86]

Ordinarily, aid workers operate in dangerous & unsuitable environments. However, the use of IEDs aggravates the risk to their safety. The utilisation of IEDs restricts the delivery of humanitarian and food-related assistance. The cost is a lot of money and resources fuelled into security for adequate protection of humanitarian personnel.

[83] PRIO, "Understanding Attacks on Humanitarian Aid Workers."
[84] Chatham House, "The impact of IEDs on the Humanitarian Space in Afghanistan."
[85] Explosive Weapons in Populated Areas humanitarian, legal, technical and military aspects.
[86] Landmine and Cluster Munitions Monitor "Cluster Munition Monitor 2019: Victim Assistance" August 2019.

Conclusion

In our society today, Improvised Explosive Devices now constitute a threat. The slow efforts of governments and international organisations have placed us years behind these threats due to their widespread existence today. The military also makes use of explosive ordnances. This begs the question of whether a restriction or the total elimination of such would favour the world at large.

Further Research

Is it only Terrorists that use IEDs? What effect does explosive ordnance have on NGOs? What can the UN, alongside member states, do to eliminate the threat of explosive ordnance? How effective have measures in the past been? What can be done to ensure children are not victims of the threat of explosive weapons? How can improper disposal be reduced?
Should there be regulations around the production of such explosive weapons? What are the long-term and short-term effects of Improvised Explosive Devices?

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The article provides an analysis of Cluster Munitions evaluating the definition, use, impact, laws and issues surrounding the concept of cluster munitions. The report can serve as a guide on how to deal with explosive weapons. A useful tool to States, international, regional organisations, civil society and those involved in addressing the consequences of these weapons.

-UNIDIR "Our Governance" is available at https://unidir.org/governance (accessed 5 April 2022)

This site provides adequate information on the structure of the United Nations Institute for Disarmament Research. This report contains details such as the different offices comprising the UNIDIR working together for efficiency. Most Importantly is also, its connection with the United Nations General Assembly.

-UNICEF "Protecting children from explosive weapons", available at https://www.unicef.org/protection/protecting-children-from-explosive-weapons (accessed 5 April 2022)

This link provides an overview of the plight of children in conflict situations. Attention must be brought to the challenges faced by innocent and vulnerable children who are forced to bear the consequences of the bickering of nations. The report lists statistics on the effects of explosive weapons caused by exploration on children, why children are victims and the resultant effects of such harm on children.

-UNMAS "Who we are", available at https://www.unmas.org/en/who-we-are (accessed 5 April 2022)

The United Nations Mine Action Service official website provides a comprehensive explanation of why the UNMAS was established, its location, target, leadership and its major motivation. This website also gives access to the UNMAS Strategic Plan of 2019-2023.

-UNOAU "Peacekeeping Planning and Management", available at https://unoau.unmissions.org/mine (accessed 5 April 2022)

The United Nations Office to the African Union emphasises the importance of combined efforts of nations of the world to counter the threat of Landmines, cluster

munitions and IEDs. This document makes Africa's stance and supports clear on security matters in times of emerging post-conflict societies around the world.

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Role Of Science And Technology In The Context Of International Security And Disarmament

"We need a radical shift about how we think of weapons. We need a shift to consider technologies that may be far removed from the battlefield, are not weaponized in the traditional sense, and nevertheless significantly contribute to the conduct of hostilities. We need to move on from describing Article 36 as strictly requiring a weapons review and acknowledge that the choice of non-weaponized technologies may influence militaries"

- ***Mary Ellen O'Connell (Research Professor of International Dispute Resolution)***

Introduction

Along with disarmament and non-proliferation of weaponry, international security is crucial in preventing conflict and ensuring international peace. New developments on the global stage concerning arms deals, proliferation, and use of outlawed weapons such as anti-personnel mines and science and technology such as artificial intelligence, nanotechnology, space technology, blockchain cybersecurity, and ICT, to name a few, are of great concern for collective security. These technological advances are driven by the digital revolution, which commenced decades ago.[87] These advances are centred around gathering, processing, and analysing a large amount of data from the information sciences, which has implications for numerous areas of research and development. The development shows great tendencies in improving the day-to-day living standards of people and social and economic benefits for the development of nations.[88] In the same vein, it has the potential to threaten world peace and security if employed for illegitimate purposes by military and security users. It can undermine

[87] Camino Kavanagh 'New Tech, New Threats, and New Governance Challenges: An Opportunity to Craft Smarter Responses?' Carnegie Endowment for International Peace (August 2018).
[88] Council on Foreign Relations 'The UN Security Council Tackles Emerging Technologies'(March 2021).

our ability to maintain effective arms control, disarmament, and security regimes. The technologies are largely capable of dual-use as they can be used to enhance socio-economic developments and serve malicious or lethal purposes, making efforts to manage them much more complex. Technological developments are taking place beyond the purview of the government. In most cases, the innovation is out-spacing states' ability to keep up with the latest developments and their possible impacts on society.[89]

Even though a handful of national governments have developed policies to curtail these effects, the global reach of these technologies and their impacts needs a multilateral new approach that may be very difficult to agree on. This is so as there are various actors implicated. The technology in question has a cross-border reach and implication on societies and the different values and political systems at play. In 2007, the General Assembly, for the first time, adopted a Resolution (72/38) on the role of science and technology in international security and disarmament at its seventy-second session. At the end of the session, it requested the Secretary-General to provide a report on future science and technology and its impact on international security and disarmament.[90] Article 36 of Protocol Additional of 1977 to the Geneva Convention[91] also states that all states studying, developing and producing new weapons are obliged to ensure that their use would not be prohibited under the provision of international humanitarian laws as a whole.

Significant technological advances are being made across all fields, particularly artificial intelligence, information communications technology, space technology, and nanotechnology. This has implications for new weapons, methods of warfare and other security applications,[92] which in turn affect international policy and legal frameworks

[89] Camino Kavanagh 'New Tech, New Threats, and New Governance Challenges: An Opportunity to Craft Smarter Responses?' Carnegie Endowment for International Peace (August 2018).
[90] United Nations 'The Role of Science and Technology in the context of International Security and Disarmament'.
[91] Protocols Additional To The Geneva Convention (August 1949).
[92] Vinod Anand 'Impact of Technology on Conduct of Warfare' Strategic Analysis: A Monthly Journal of the IDSA.

intended to govern weapons and methods of warfare. Technology is not static, and far more work is needed to gauge and tackle the arms control implications of these technological advances.[93]

International and Regional Framework

The role of science and technology in international security and disarmament has been an issue in the international community since 1988[94] when *resolution (44/77)*[95] was passed. This resolution was on the role of science and technology in global security and disarmament, with 129 countries voting in favour. The resolution requested the Secretary-General (SG) to follow future scientific and technological development, particularly those with military applications and evaluate their impact on international security. It also requires states to establish a panel at the national level to monitor and evaluate such developments and send reports to the SG. A report was to be submitted at its fifty-fourth session[96]

Resolution A/45/568 was adopted after a report made by the SG[97]. The report was made after a constituent meeting held in May 1989. Experts were required to submit individual papers to assess the impact and military potential of the developments in those fields. In 1990, a report made by the SG was conveyed to *resolution 45/60*[98]. The report set the international community to position itself better to follow technological changes. A resolution was adopted on the issue for the first time in 2006 in *resolution 72/28*[99]. The resolution recognises that

[93] International Committee of the Red Cross 'New Technologies and IHL'
[94] United Nations 'Role of science and technology in the context of international security and disarmament'.
[95] United Nations General Assembly Resolution A/RES/43/77.
[96] United Nations 'Role of science and technology in the context of international security and disarmament'.
[97] UN General Assembly Resolution A/45/56 'Science and technological development and their impact on international security'.
[98] United Nations General Assembly Resolution A/RES/45/60.
[99] United Nations General Assembly Resolution 72/48.

science and technology can have military implications, but the civilian application needs to be monitored and encouraged.

The UN Charter in Article 2(4)[100] obliges states to refrain in their international relation from the threat or use of force against the territorial integrity or independence of a state. *Article 36 of the Additional Protocol to the Geneva Convention*[101] imposes obligations on states to determine if the development, acquisition or adoption of new weapons, means and methods of warfare will be prohibited under international law. *The European Commission, Horizon 2020*,[102] a regional framework, seeks to help the EU with research and innovation funding. It was to conduct research into science and technology that would aid the UN in achieving the SDG and boost its competitiveness and growth. *The Treaty on the Prohibition of Nuclear Weapons in Latin America,* a regional framework, requires state parties not to acquire or possess nuclear weapons or permit storage for the deployment of nuclear weapons on their territory[103]. *The African Union and European Union High Level Policy Dialogue (HLDP[104]) on Science, Technology, and Innovation,* another regional framework, aims to provide a platform for exchanging research and innovation policy to formulate long-term priorities and strengthen cooperation between the continents.

The Role of the International Systems

As of late, there has been an expanded interest in the role of science and technology in global security and disarmament due to the revelation that science and technology's innovative

[100] United Nations Charter Article 2(4).
[101] United Nation Protocol Additional to the Geneva Convention 1977.
[102] European Commission Horizon 2020.
[103] Treaty on the Prohibition of Nuclear Weapons Latin America (UN Document A/6663).
[104] African Union and European Union High Level Policy Dialogue (HLDP#) on science, technology and innovation.

capacities are vital for social and financial advancement and essential in guaranteeing peace and security.

This issue was first introduced to the General Assembly agenda in 1988, with India as the main sponsor, and the first resolution on the issue was adopted on 7 December 1988. It was adopted with a recorded vote of 129 in favour, 7 against, and 14 absent, when numerous supplies were used to develop new weapon frameworks, engendering security vulnerability and instability.

By adopting the initial resolution[105] on the issue, the UN Secretary-General was implored to monitor future scientific and technological innovations, especially those with potential military applications, evaluate their effect on worldwide security, and report back.

The reports underscored the significance of both qualitative and quantitative instruments in the disarmament process, considering that scientific improvements can have both civilian and military purposes. This highlights the global inclinations on the subject, the need to intently monitor scientific and technological advancements that might adversely affect security, arms control and disarmament process, and the need to channel scientific and technological improvements for useful purposes. Also, progression in science and technology for civil reasons should be encouraged while considering the potential for scientific advancements to be utilised for military purposes, which could prompt deadly outcomes.

The United Nations has coordinated several meetings on this issue, including the United Nations Conference on new trends in Science and Technology: Implications of International Peace and Security, held at Sendai, Japan, in April 1900[106] and the United Nations gathering on Conversion: Economic Adjustments in an Era of Arms Reductions, held in Moscow in

[105] United Nations General Assembly Resolution A/RES/72/28 'Role of science and technology in the context of international security and disarmament.'
[106]International Atomic Energy Agency NCL Collection Store Pdf

August 1990.[107] It gave rise to advancing international cooperation among countries and associations for the use of scientific innovations for disarmament-related goals, for example, verification and compliance by parties with arms control and disarmament agreements, as well as the use of further scientific innovations in weapons verification and disposal. Likewise, The United Nations Institute for Disarmament Research (UNIDIR) hosted The 2020 Innovations Dialogue: Life Sciences, International Security And Disarmament. The Dialogue examined the innovations in science and technology, multilateral governance instruments needed to address dual-use technologies, and how emerging technologies and advances can be effectively (or appropriately) used in disarmament agendas.

On 27 November 2020, in Geneva, the International Community to Abolish Nuclear Weapons (ICAN) hosted a one-day expert meeting on the increased risk of nuclear weapon use posed by emerging technologies, including applied machine learning and cyber warfare.

The meeting brought together a group of roughly a dozen academics, policymakers, and activists to debate the growing threat posed by the application of emerging technology to nuclear weapons, the solutions to mitigate this threat, and how to inform the public about it. They also discussed how emerging technologies could assist with disarmament.

Specialists have written papers evaluating the effect of emerging technological developments on military capability.

Stockholm International Peace Research Institute (SIPRI) is an independent international institute dedicated to researching armaments, arms control, and disarmament. After extensive research, the organisation releases publications and research papers that examine the challenges emerging from the interaction between emerging and older technologies.

[107] International Nuclear Information System Repository Search - Single Result

Also, SIPRI's research on emerging military technologies monitors significant developments in science and technology. It highlights the way in which these developments can undermine or improve peace and security. The research is tailored to create informative and evidence-based recommendations on which policymakers, stakeholders (both the public and private sectors), and experts from different regions and groups can debate.

Article 36 is a specialist non-profit organisation focused on reducing harm from weapons. As a feature of its examination project on "Science, Technology, and Weaponization," it probed the targets and values that novel weapon technologies and new military use of science and technology are intended to accomplish. It also examined the effect of multilateral disarmament objectives, and what, if anything, disarmament policymakers can and ought to do about it. The project's last report, "Envisioning Sustainable Security: The Evolving Story of Science and Technology (S&T) in the Context of Disarmament,"[108] assess UN resolution, reports, and pronouncements on Science and Technology and disarmament. It also critically evaluates dominant attitudes and beliefs about the role of Science and Technology development in creating security, outlining the issues to be tended to, and proposed visions.

Likewise, the Working Group II Disarmament Commission report[109] proposes the reconversion of the military industry for peaceful purposes and its effect on the worldwide development of science and technology as potential items considered in future resolutions.

A new wave of innovation is driving tremendous change worldwide. The UN and other multilateral organisations should figure out where they can assume a valuable part in tending to and incorporating science and technology into their work and where existing systems and different actors might be better positioned.

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[108] Envisioning sustainable security: The evolving story of Science and Technology (S&T) in the context of disarmament.
[109] Report of Working Group II Disarmament Commission.

For instance, the UN has made considerable progress in incorporating emerging technologies into its work. In peace and security, emerging technologies have been used to forestall conflict by lessening the time between warning and response, fostering peacekeeping by educating and empowering local actors to operate sophisticated devices appropriate for complex societies.

The use of digital tools and ICTs have also been used to perform interventions that are beyond traditional preventive diplomacy. These tools incorporate data collection, examination, and the spread of information on different parts of a conflict, including underlying factors, triggers, and fundamental reasons for prolonged conflict.

The Weaponization of New Science and Technology

Technologies are often examined as individual pieces of hardware such as computers, but they go beyond this as they are the most commonly used weapons.[110] It is a general principle of history that new technologies, even beneficial ones, are used as weapons or as instruments of warfare.[111] The continuous development in science and technology has implications for the emergence of new weapons, means and methods of warfare and other security implications. New and changing military technology can project significant risks to life and cause a drastic change in international relations. This should therefore be an issue of significance to the international community.

Technology development has become a rat race.[112] Science and technology have become the centre of global power play in a competition to lead innovation in technology and future warfare battlegrounds. weaponization implies that technology is neutral or civilian by nature

[110] Brian Martin, ' Technology, Violence and Peace', (University of Wollongong).
[111] *ibid*.
[112] Jayshree Pandya 'The Weaponization of Artificial Intelligence', Forbes (January 2019).

and is subsequently converted to military purposes. There is an issue of recognising, classifying and prioritising what should be considered relevant development in science and technology. In biological and chemical weapon control, establishing processes for effective review of advances in science and technology has been a key concern. There is no multilateral body that reviews science and technological developments in relation to conventional weapons, means and methods of warfare. However, the UN Convention on Certain Conventional Weapons (CCW) can provide a framework for consideration.[113] Innovation can undermine or improve one's capacity to manage effective arms control, disarmament, and security regimes. For example, new tech can help detoxify chemical warfare agents and create metal-force firearm mechanisms (it can allow greater control in the application of force but may also pose a greater risk to the human race).

The 2016 Review Conference of the CCW acknowledged the instrument's key role in monitoring ongoing developments in new weapons, means and methods of warfare.[114] Accordingly, it considered how relevant science and technology developments can be addressed within the framework of the convention. On a broader view, the UN General Assembly's first committee adopted a resolution by India in October 2017 that tasks the UN Secretary-General to report to the GA on current developments in science and technology and potential impacts on the international security and disarmament effort.

Article 36 of the Additional Protocol to the Geneva Convention also projects on science, technology, and weaponization. It is designed to exchange a better understanding of science and technological development relevant to international control of contextual weapons and develop a practical global framework that scrutinises these developments.

The development of autonomous weapon systems is increasing rapidly. This increase in the weaponization of AI seems to have become highly destabilising to development. Today, the

[113] Maya Brehm & Ora 'Science, technology and weaponization: preliminary observations' (November 2017).
[114] *ibid*.

reality is that AI is leading toward a new algorithm warfare battlefield that has no boundaries or borders and can operate across the human ecosystem with or without human control. As a result, the idea of the weaponization of AI, which, once activated across the ecosystem, can engage and select human and non-human targets without intervention by a human designer, causing a greater risk or fear.

For example, the "MQ-9 Reaper" by General Atomics[115] (semi-autonomous) is a remotely-controlled "Unmanned Combat Aerial Vehicle '' (UCAV) that carries a lethal payload and has intelligence surveillance and reconnaissance capabilities. It can remain in the air without a pilot and navigate in-flight through an automated GPS-based system.[116] The fact that an intelligent machine can perform any projected warfare task without any human involvement using only computer programming and algorithms with the interaction of its embedded sensors in the human ecosystem poses a great risk. Similarly, the Israeli "Harpy" Loitering Bomb can dally in the air for a long time, looking for adversary radar signals.[117] When it identifies this, it assaults and destroys the enemy radar through controlled self-destruction. The rapid development in AI shows that it is on its way to revolutionary warfare. For example, the US Navy's X-47B[118] is autonomous during take-off and landing, and it completed its first autonomous refuelling in 2015. This weapon could be allowed more autonomy in executing its functions, making the further weaponization of AI inevitable. This will result in an acceleration of efforts globally to gain a competitive advantage in science and technology.

Information and communication technology (ICT) is an area of global investment. Computing power continues to grow with sensor and networking and other technology advances. This development already significantly impacts how militaries and security actors operate. An increasing amount of data is collected, analysed, and communicated for military and security

[115] US Department of Defence, Office of the Secretary of Defence, "Unmanned Aircraft Systems Roadmap 20005-2030" (2005).
[116] Shweta Nair, "Rise of the Robots:Weaponization of Artificial Intelligence" National Maritime Foundation (April 2021).
[117] "Harpy", Israel Aerospace Industries.
[118] Northrop Grumman, "X-47B UNCAS makes Aviation History... Again."

purposes. Machine learning offers various potential military applications with the continuous development of digital cognitive technology or computer vision.

Advances in material science will have military applications, with some being specifically researched for this purpose. Development of new materials for weapons that are more lethal, smaller and safer to use and materials that enable construction in weapon designs are significant for conventional weapons control.

If more technology is being deployed, it brings us to the question of what technology should be allowed, restricted or outrightly banned. There is an undesired democratisation of the capacity to inflict major damage as small groups of people with innovations and access to new technology can now effectively challenge larger groups with the help of information online. It is now easy to sit within the corners of your room and manufacture bacteriological weapons targeted at particular types of people. These weapons may be less powerful than nuclear weapons but pose a more significant threat as they are difficult to control.

Cyberattacks are becoming prominent in the world, about 2,200 cyberattacks happen per day.[119] This can be equated to one cyber attack every 39 seconds. Many Americans see cyberattacks as a commercial nuisance. Still, it has the potential to shift signings into aspects of the economy or neutralise military assets. It is also noteworthy that new technology that could be used as weapons in unrestricted warfare is increasingly part of our day-to-day lives.

It is identified that a range of non-military means outside the state's control tends to affect more powerful adversaries. For example, social media may not have been militarised, but it has certainly been weaponized as servicemen use them to promote hostile campaigns.

Emerging technologies can also be invisible threats that affect the peace of civilians.[120] In Africa, the past years have been filled with misinformation and fake news. For example, the

[119] Independent Commission on Multilateralism 'The Impact of New Technologies on Peace, Security and Development' (April 2016).

[120] Michal Onderco & Madeline Zutt 'Emerging technology and nuclear security: What does the wisdom of the crowd tell us?', Contemporary Security Policy, (2021).

securitising of the fifth-generation mobile network (5G), which is said to provide high-speed, optimum performance and improved connectivity.[121] However, an anti-5G conspiracy movement led to arson attacks, and some engineers received physical and verbal threats, especially in the north[122].

New technologies have also given rise to modern forms of hybrid warfare.[123] Widely available technology such as mobile phones and the internet are increasingly used to support war efforts by facilitating communication, influencing public opinion, teaching new warfare techniques, gathering intelligence, and engaging in cyberattacks, as demonstrated in the Ukraine conflict.[124]

Technological change has always shaped the evolution of international security and threatened to upset the balance of powers. However, we need to consider the potential dark side of developed science and technologies. New technologies, especially those with Artificial Intelligence (AI) algorithms, can improve or undermine our ability to maintain effective arms control disarmament even though not weaponized.

Addressing Humanitarian And International Security Challenges Posed By Emerging Technologies

Science and technological developments have given rise to new methods of warfare like armed drones and robots, cyber-attacks, and biowarfare, amongst others. Therefore, it is essential for states, when developing or acquiring new methods of warfare, to assess whether

[121] Velomahanina Tahinjanahary 'Implications of Emerging Technologies on Peace and Security in Africa' (August 2021).
[122] *ibid*.
[123] Alex Deep, "Hybrid War: Old Concept, New Techniques," Small Wars Journal,(March 2015).
[124] Tim Maurer and Scott Janz, "The Russia-Ukraine Conflict: Cyber and Information Warfare in a Regional Context," International Relations and Security Network, (October 2014).

it complies with International Humanitarian Law (IHL), as any technology for warfare must be used in compliance with the IHL.

Some technological developments may pose challenges in terms of how the rules of IHL should be interpreted and applied by member states. Therefore, emerging technologies have raised ethical issues regarding their use in armed conflicts such as how IHL rules should be interpreted and applied, considering the unique characteristics of emerging technologies.

One of the most crucial questions posed is relevant to the premise of the rules of IHL that allow combatants to use weapons against their adversaries during hostilities. Those rules are in place from the beginning of any armed conflicts to the close of military operations in states' territories. The essential question is whether IHL rules are sufficient to provide legal guidance for protecting civilians, combatants, and the environment from the new weapons resulting from emerging technologies.

Unmanned attacks have been possible because of military technology innovation. Lethal Autonomous Weapons Systems (LAWS) have also been explored, and attacks such as cyber operations do not necessarily require physical force. After the development of micro-fusion nuclear weapons, the classifications of traditional weapons may be altered. This raises questions about whether such weapons should be stopped preemptively, given their potential dangers.

These questions are relevant because innovation in military technologies allows for the destruction of lives, properties, and the environment. "means and warfare", "military attacks", "use of force," civilians, "combatants", and "battlefield," which make up IHL today.

In 1966, the International Court of Justice (ICJ) pointed out that the legal assessment of the use of weapons comes with two "cardinal rules" of IHL: the rule of distinction and the prohibition of unnecessary suffering.[125]

The rule of distinction states that parties to an armed conflict must distinguish civilians from combatants in military operations and only target the former.[126] The prohibition against unnecessary suffering for combatants prohibits superfluous injury and suffering when attempting to achieve a legitimate military objective.[127]

In light of the cardinal rules, weapons are prohibited as "means of warfare" if they are incapable of following the IHL's two cardinal rules. However, weapons are permissible as means of warfare but remain regulated according to "methods of warfare" if they are compatible with the two cardinal rules of IHL. Also, despite the arguments regarding the limits of damage allowed and prohibited, another cardinal rule of IHL is environmental protection.[128]

During hostile operations, attacks on military targets that cause accidental damage to civilians and civilian property may be permitted as collateral damage. This collateral damage should not be considered excessive compared to the anticipated concrete and direct military advantage.[129] The principle of proportionality in attacks, which limits collateral damage, is a norm under customary international laws[130] and a *jus cogens*,[131] and so is the rule of distinction. Protecting civilians and civilian items requires precautions against attack[132] and protection from the effects of an attack.[133]

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[125] I.C.J. Reports 1996, p. 257, para. 78.
[126] Additional Protocol I, Articles 48, 51 and 52.
[127] Additional Protocol I, Article 35.
[128] *ibid,* Article 55.
[129] *ibid,* Article 51.
[130] Henckaerts and Doswald-Beck, p. 46.
[131] Casey-Maslen, p. 96.
[132] Additional Protocol I, Article 57.
[133] *ibid*, Article 58.

It is important to note that in the conduct of hostilities, the military should only use weapons of war against legitimate targets and not civilians.[134] Rosalyn Higgins, former president of the International Court of Justice, emphasised that civilians should not be attacked with weapons of war during hostilities.[135] This is the basis for the rule of distinction.

However, technological innovation is moving rapidly, resulting in weapons and devices such as unmanned combat vehicles and robots. Moreover, cyberspace and outer space are also considered potential battlefields in recent times.[136] Therefore, it is essential to ask whether IHL provides enough legal guidance to protect civilians and combatants from rapid innovations in weapons made possible by scientific technologies.

Data processing and analysis have improved dramatically. The rapid growth of information technologies birthed artificial intelligence (AI), which has led to an exponential increase in the operational capabilities for weapons such as firing and targeting. This has sparked international debates about Lethal Autonomous Weapons Systems (LAWS), sometimes called "killer robots" or “slaughter bots,” and other automated weapon systems such as unmanned combat vehicles (UCVs), which include "drones".[137]

The development of information technology enables precision-guided attacks and stand-off attacks through drones. Drones are already in operation or over battlefields. Research shows that 12 states are believed to have used armed drones to conduct lethal strikes between 2001 and 2019, and another 27 states have used them without lethal strikes.[138] Based on the overwhelming amount of publicly available data, many civilians have been killed in US strikes against suspected terrorists. According to the Bureau of Investigative Journalism, between

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[134] *ibid*, Article 51.
[135] Dissenting Opinion of Judge Higgins, I.C.J. Reports 1996, p. 363, para. 12.
[136] Schmitt, p. 145.
[137] Vincent Boulanin (ed.), The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk, Vol I (SIPRI, 2019), p. xii.
[138] New America, “World of Drones: Who Has What: Countries with Drones Used in Combat.”

2010 and 2020, US drone strikes and other covert actions in Pakistan, Afghanistan, Yemen, and Somalia killed 910-2,200 civilians and 283-454 children.[139]

LAWS also pose concerns as regards IHL. LAWS is defined as "Any weapon system with autonomy in its critical functions...a weapon system that can select (i.e. search for or detect, identify, track, select) and attack (i.e. use force against, neutralise, damage or destroy) targets without human intervention."[140]

It is agreed that autonomous weapon systems[141] and drones[142] must adhere to the IHL rules. IHL rules require parties to conflict who use weapons to conduct hostilities to adhere to the IHL rules. In the event of violations, they will be held liable.[143] Also, International Criminal Law (ICL) states that combatants are responsible for their criminal behaviour.[144]

Precision-guided attacks may comply with the rule of distinction[145]; however, it is unclear whether drones operating without combatants on a battlefield can abide by the IHL rule.[146] In reality, drone strikes in some countries have decreased,[147] while in others, cases of errant drone bombings that kill civilians have been reported.[148] If UCVs are operated on or off the battlefield by human beings, it is legal to trace the responsible parties; human intervention can still be made.

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[139] The Bureau of Investigative Journalism "Drone Warfare."
[140] Christopher Sawin, "Creating Super Soldiers for Warfare: A Look into the Laws of War," Journal of High Technology Law, Vol. 17, No. 1 (2016), p. 1.
[141] CCW Doc. CCW/GGE.1/2019/CRP.1/Rev.2, August 2019, pp 1-14, Annex IV, p. 13; Kimiaki Kawai, Emerging Technologies Challenge International Humanitarian Law.
[142] Peter Maurer, The use of armed drones must comply with laws, interview of ICRC President on 10 May 2013.
[143] Additional Protocol I, Article 86, 87 and 91.
[144] Rome Statute of the International Criminal Court, Article 25 and 28.
[145] Schmitt, p. 162.
[146] *ibid,* p. 160.
[147] For instance, see the data of US air and drone strikes in Pakistan.
[148] Ahmad Sultan and Abdul Qadir Sediqi, "U.S. drone strike kills 30 pine nut farm workers in Afghanistan," (Reuter, 19 September 2019).

However, an ongoing debate is whether LAWS can be expected to observe the IHL rules in practice and law. As the topic of responsibility is unclear, it becomes essential to ask who should be held responsible in the event of a violation.[149]

Similarly, emerging biotechnologies aim to modify human genes to increase soldiers' mental and physical abilities. These genetically engineered soldiers are often referred to as "super soldiers." This is because they possess superhuman abilities that most humans do not. These superhuman soldiers were once thought to be entirely fictional in the past.[150]

However, a study shows that four elements of military needs are possible and practical by 2050 or earlier. These are ocular enhancements to image, sight, and situational awareness; restoration and programmed muscular control through an optogenetic bodysuit sensor web; auditory enhancement for communication, protection, and direct neural stimulation of the human brain to allow two-way data transfers.[151] This raises the question of if a soldier with such extraordinary capabilities qualifies as a combatant under IHL.[152]

IHL has addressed these concerns by reiterating that IHL applies to all forms of warfare and methods, including emerging technologies. Furthermore, the IHL was designed to be flexible enough for technological developments to be adapted to them, even those considered impossible at the time.

This is clearly stated in Article 36 of the Additional Protocol I (API) of the 1949 Geneva Conventions.[153] According to Article 36, states are required to decide whether international

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[149] ICRC, Autonomous weapon systems: Technical, military, legal and humanitarian aspects, Expert meeting, Geneva, Switzerland, 26-28 March 2014, p. 8.
[150] Christopher Sawin, "Creating Super Soldiers for Warfare: A Look into the Laws of War," Journal of High Technology Law, Vol. 17, No. 1 (2016), p. 1.
[151] Biotechnologies for Health and Human Performance Council study group, Cyborg Soldier 2050: Human/Machine Fusion and the Implications for the Future of the DOD, (U.S. Army Combat Capabilities Development Command Chemical Biological Centre, 2019).
[152] Additional Protocol I, Article 43.2-It simply stipulates that "members of the armed forces of a Party to a conflict are combatants" and "they have the right to participate directly in hostilities."
[153] Additional Protocol I, Article 36.

law would prohibit them from employing a weapon, method, or means of warfare in study, development, acquisition, or adoption.

Article 36 of API could be used as a basis for investigating the legality and regulation of new weapons. This would strengthen IHL and contribute to the development of International Disarmament Law. Still, there is the question of whether the API can be used to regulate weapons other than conventional ones.[154] This is due to the history of negotiations, suggesting that API was originally meant to regulate conventional weapons. Article 36 of the API is expected to play an important role in regulating new weapons. However, as mentioned previously, one of its challenges lies in the composition of the state parties to the protocol. It is up to the respective state parties to determine how Article 36 will be implemented.

Article 36 is supplemented by Article 82, which states that legal advisors must be available to advise military commanders about IHL and on the appropriate instruction to be given to the armed forces on this subject.

Rapid innovation in military technology has led to the accelerating growth of new methods of warfare. Therefore, the fundamental question is whether IHL provides sufficient legal guidance to safeguard civilians, combatants, and the environment against rapid technological innovation in weapons. This question is pertinent as the advancement of military technologies allows for the creation of new weapons/capabilities that have been improved drastically to enable destruction. For these reasons, member states are urged to establish new national and international regulations regarding weapons that incorporate certain emerging technologies.

[154] Canada made a reservation to API at the time of ratification saying that "the rules introduced by Protocol I were intended to apply exclusively to conventional weapons.

Science and Technology As A Means Of Achieving Peace Keeping Operations

Science and Technological advances have profoundly impacted and provided beneficial applications in our everyday lives. Information technology connects people and facilitates communication. New medicines, treatments, and vaccinations help save lives, enhance quality, and increase life expectancy. Our common goal should be to utilise technological developments to advance humanity and preserve the environment. Science and technology are great tools to help us achieve specific Sustainable Development Goals (SDGs). SDG 16 can benefit from such innovations to promote peace, security, and strong institutional structures.

The effects of technology on security or warfare have been demonstrated. However, technology can't remain static. This has led to concerns about the potential misuse of technology. As a result, technology control systems have been a crucial component of national security strategies. They help to limit proliferation and deny technological advantages to non-state entities. Future challenges to arms control and non-proliferation will require greater cooperation among interdependent states.

The IT revolution has changed the way people live in modern, progressive countries. Over the past 50 decades, space technology has made incredible advances and achieved remarkable technological breakthroughs that have added a new dimension to security and threat perceptions. In addition, other enabling technologies like semiconductors, integrated circuits and computers have significantly enhanced technological capabilities and system performance. This dependence on digital electronics and IT has changed every area of life, including security and defence.

Cyber-warfare techniques, unlike conventional military hardware that kills and causes destruction, use intangible software tools that can be used to disable military capabilities and

international trade. These cyber-warfare techniques are used to implement both defensive and offensive strategies. This technology makes individual brainpower more valuable than techno-industrial equipment, leading to a loss of the vast technological advantage that the Western industrialised countries have built up over many years. In June 2010, Stuxnet, a computer worm that targeted Iran's nuclear program, was one of the most advanced cyber-attacks in history. The malware spread through Infected Universal Serial Bus devices, data collecting and supervisory control systems. According to reports, the attack, according to most reports, severely harmed Iran's ability to develop nuclear weapons.[155]

New threats exist to information-based societies, and information security has become as crucial as the defence against WMD attacks. Technology has made warfare less visible and more violent. It now offers subtle, invisible, and decisive capabilities to disable the enemy's computer environment in a warlike climate.

The new vulnerabilities have already influenced today's defence strategies. Military objectives can now be achieved using information and IT to protect national security interests. The paradox is that the advancements in sensor technologies and the enhanced IT capabilities have enabled the technological edge required to counter WMD threats. IT can assist with comprehensive monitoring and verification techniques to verify compliance and early detection and prevention of proliferation activities. It complements the national technical resources for monitoring and verification. This will make it possible to verify the reduction or elimination of WMD weapons and improve confidence among countries participating in cooperative disarmament.

Despite not receiving the funding or attention it deserves on the international stage, conflict prevention is likely to change with the advent of new technology tools. Crisis mapping, social

[155] Irving Lachow, "The Stuxnet Enigma; Implications for the Future of Cybersecurity," Georgetown Journal of International Affairs (2011), pp. 118-126.

media mapping, and crowdsourcing tools are all ways to generate data about conflict indicators; these tools can be used to identify patterns and help monitor violations of ceasefires or human rights. ICTs offer opportunities to gather data on crime and conflict and reduce the gap between response and warning.

Technologies that enable monitoring and observation are particularly useful for peace operations, such as unmanned aerial vehicles (UAVs), motion detectors, video monitoring systems, and satellite imagery.[156] These technologies are especially useful for peace operations in the increasingly asymmetric threats environments where they operate.

While new technologies have revolutionised the way wars are fought and won, UN peace operations have struggled to incorporate these technologies into their increasingly complicated mandates.

The new technologies offer many opportunities to manage conflict and build peace, especially locally. Emerging technologies can benefit peace operations in various less controversial areas, such as monitoring and protecting civilians. Participatory data collection, processing tools and helping with conflict prevention can also empower communities to resist violence or recover from conflicts. In addition, ICTs can promote alternative discourse and community engagement. Furthermore, technologies that are used to propagate hate could also be used to spread messages of peace and love.

Multilateral systems have increasingly acknowledged the potential of new technologies for peace and conflict prevention. For example, the 2005 Tunis Commitment was a consensus statement by the WSIS. It recognised the importance of ICTs in preventing conflict through

[156] A.Walter Dorn,Keeping Watch: Monitoring Technology and Innovation in UN Peace Operations (Tokyo: United Nations University Press, 2011).

an early-warning system, promoting peaceful resolution, supporting humanitarian action and assisting post-conflict reconstruction and peacebuilding.[157]

The UN secretary-general appointed a panel to examine the impact of technology and innovation on UN peacekeeping operations. In its final report, the UN secretary-general mandated a panel of experts to examine the use of technology and innovation in UN peacekeeping. The panel also recommended institutionalising innovation as well as continuous technological adaptation.[158] The UN Secretary-General's High-Level Independent Panel on Peace Operations (HIPPO) supported these recommendations. In addition, it recommends prioritising "enabling" technologies to improve safety, security, civilian protection, shelter and camp management, and early warning and civil protection capacity.[159]

Multilateral efforts have been made to prevent conflict. For example, the United Nations Development Programme (UNDP) has already implemented programs that use new technologies to prevent conflicts and continues to explore this topic.[160] In addition, the Intergovernmental Authority on Development, which encompasses eight East African countries, has launched the ICT 4 Peace project in its Conflict Early Warning and Response Mechanism (CEWARN).[161]

The international community spends a lot of time worrying about the potential negative effects of science and technology; rather, member states should focus on promoting and maximising science and technology's benefits for disarmament, international security and peace, using the innovations in science and technology.

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[157] 8 World Summit on the Information Society, Tunis Commitment, UN Doc. WSIS-05/TUNIS/DOC/7-E, November 18, 2005, para. 36.
[158] Expert Panel on Technology and Innovation in UN Peacekeeping "Performance Peacekeeping," December 22, 2014.
[159] UN secretary-general, "Report of the High-Level Independent Panel on Peace Operations," UN Doc. A/70/95-S/2015/446, June 17, 2015, para. 313.
[160] UN Development Programme, "Issue Brief: Using Technologies for Conflict Prevention," March 2012.
[161] Conflict Early Warning and Response Mechanism,"The CEWARN ICT 4 Peace Project: Use of Information Communication Technologies (ICTs) for Conflict Prevention.

New trends in Technology and implication on international peace and security

It is well-known that new technological change shapes the evolution of international security and threatens to upset power distribution. The difference is in the rapid and accelerating pace of the change. Technological development will continue to give rise to new methods and means of warfare like cyber attacks, armed drones and robots.[162] In recent times, arms and ammunition have come a long way from the mere use of spear, bow and arrow to high technical war equipment[163]. Technological developments have led to the creation, and use of nuclear weapons, space weapons, missiles, submarines and drones in war and are becoming more precise and lethal. The technological advances affect how warfare equipment is built, leading to more unpredictability of their future impact on international security.

The desire to minimise the risk to emerging science and technology leads to more automation and more advanced weapons. It allows the state to counter attempts to internal threats to its authority. The First Gulf War was an important step because it revealed to Western society the power of technology in a conventional war.[164] At the end of the Cold War, the Western government's thirst for technological innovation and its invention of complex weapons increased.[165] Today, states continue to see their security through the prism of technological advances and technological innovation in war techniques.[166] In Russia, the new hypersonic glide testing was completed in 2017 and was launched in December 2019.[167] According to a Tass report in 2018, the Kinchal hypersonic glide is an air-to-ground weapon carried on Russian MiG-31K fighter jets and has a reported range of 1,240 miles (2,000 kilometres).[168] This technology can reduce the time required to reach a target and is loadable

[162] International Committee of Red Cross 'New Technologies and IHL.'
[163] Shravya, ' How has modern technology changed warfare' (August 2015).
[164] Vinod Anand, 'Impact of Technology on Conduct of Warfare) (April 2019).
[165] Warren Chin, 'Technology, war and the state: past, present and future' (July 2019).
[166] *ibid*.
[167] Dr Antonio Missirilo, ' Game of Drones? How the new technology affects deterrence, defence and security'(May 2020).
[168] Tariq Malik, 'Russia says it used a hypersonic missile in Ukraine for the first time: report' (March 19, 2022).

with conventional and nuclear warheads. In September 2019, Houthi rebels from Yemen claimed the first known massive swarm drone attack on two oil-producing facilities in Saudi Arabia after defeating its air defence systems.[169]

Drones and cyberattacks are already forced in many parts of the world, especially in the Middle East, where they are proving effective.[170] There is a high tendency that they will continue to spread to most parts of the world at a higher frequency. The use of drones will also be affected by AI.[171] Autonomous drones would be able to complete tasks without any intervention.[172] Though not deployed, they are capable of surveilling and delivering supplies to areas.[173] It is feared that at some point, these drones may be used to build lethal autonomous weapons that can identify, select and deploy against targets chosen without any human intervention. Lethal autonomous weapons identify, select and engage a target without meaningful human control. There were allegations that the US strike on the Iranian scientist Mohsen Fakhrizadeh employed an AI-powered weapon.[174] More recently, Israel has recognised that AI was central to its operations against Hamas in the Gaza strip during their last conflict.[175]

According to the Secretary-General, there are two folds over the nature and direction technological change is going.[176] First, there is an overriding anxiety leer modern technology should assist rather than hinder the positive trends in international relations. There are concerns that new technology might result in construed qualitative development of nuclear weapons as efforts are being made to reduce them. The second is that there is a concern that

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[169] Dr Antonio Missirilo, ' Game of Drones? How the new technology affects deterrence, defence and security'(May 2020).
[170] Bloomberg Opinion, 'What if Technology Turns Against Us' (February 2022).
[171] Dr Antonio Missirilo, ' Game of Drones? How the new technology affects deterrence, defence and security'(May 2020).
[172] Jayshree Pandya 'The Weaponization of Artificial Intelligence', Forbes (January 2019).
[173] Jane Esberg & Christoph Mikulasdhek 'Digital Technologies, Peace and Security: Challenges and Opportunities for United Nations Peace Operations' (August 2021).
[174] *ibid*.
[175] Anan Ahronheim 'Israel's operation against Hamas was the world's first AI war' (27th May, 2021).
[176] United Nations, ' New trends in science and technology implication for international peace and security'.

significant aspects of modern technology do not address the pressing problems facing the world. While it is recognised that the diffusion of technology can bridge the economic gap between the industrialised and developing country, there is also doubt that the international community is not in a position to deal with the harmful effect of this technological proliferation. There are areas in which capable military technology promotes rather than threatens international security, like the use of information and communication technology for advancing warning of impending conflicts and employment of remote-sensing techniques for verification. The current trends in nuclear technology are largely extrapolations of past developments. The concerns regarding nuclear weapons and power proliferation have not been allayed. Still, the developments have by no means resulted in worst-case scenarios.

In the space technology field, since the first satellite orbit in 1957, there has been a significant development in space transport, spacecraft and ground segment.[177] As much as this advancement has opened possibilities for future military missions in space, the cost of hysterical missions is incalculable and can cause more harm than anticipated. Information and communication technology is pervasive as it underpins advances in materials, space, nuclear and biotechnologies, yet is dependent only on materials.[178] It provides opportunities to collect data about crime and conflict, reduce the gap between army and response, increase the efficiency of reconnaissance and communications, and confer greater accuracy in the performance of existing weapon systems. However, big data can fall into the wrong hands or exacerbate conflict through information. The development and application of information and communication technology also result in precision-guided weapons, commonly called net-centric warfare. This is conceptualised as another revolution in military affairs and is expected to alter the global balance of power.

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[177] *ibid*.
[178] *ibid*.

The risk of an arms race in emerging technology inevitably exists alongside other concerns like indiscriminate use of them. There is also the hope that this technology will be channelled into less disruptive applications like medicine and sustainable development. In medical research, AI can be used for detection, pattern recognition and simulation purposes which are equally crucial in counter-terrorism, civil protection and arms control.

Biometric technologies have also been deployed in various areas such as border control, identification, banking and the health sector. People have no control over the kind of data being collected about them. It tends to contribute to situations where civilians are subjected to symbolic violence, which can manifest in the form of surveillance capitalism and data colonialism. For states or minority populations where technologies are under-regulated, collecting, selling and storing data can qualify as symbolic violence. Symbolic violence can become direct and physical in the hands of an authoritarian state(s) and, more importantly, a significant threat to people's security if deployed.

The latest technological innovations have fostered the development and democratisation of 'stand-off' weapons, i.e. armed devices that may be launched at a distance and allow the invader to escape the disruption to the targeted area(s). As technology advances, 3D-printed weapons, known as 'ghost guns,' will likely represent a new challenge. They do not have serial numbers or markings that can identify with the owner making them untraceable. These guns could be made solely from plastic, meaning metal detectors would not detect them. These weapons also provide an incomparable degree of discretion and deniability, especially in the international community. The fall in the cost of many technologies used in both defence and by the civilian makes them accessible to violent non-state actors and weak states. For instance, if cleverly employed and combined, the development of synthetic biology (a field that combines computing and biology to engineer new biological parts and redesign existing ones) offers both state and non-state actors a new tool to inflict damage

beyond what was comprehensible a few decades ago. Ease of access to this technology in the commercial market and simplicity in operation has resulted in the pecking in of states' monopoly over weaponry, leading to the emergence of new types of warfare.

As Freedman[179] points out, the future is based on decisions yet to be made in circumstances that remain unclear to those looking into a crystal ball.[180] Emerging technologies and innovations are spreading more quickly and widely than their predecessors. Developments in biotechnology, nanotechnology, and the information revolution are creating new opportunities and ways of attacking other states. At this pace, humans will be augmented and in some instances replaced with AI and robots contending with increasing forms of lethal weaponry.

Conclusion

Science and technology play an essential role in international security and peace. We cannot stop the innovations that science and technology will introduce in the military and warfare operations; however, member states can make laws, regulations, policies, resolutions and guidelines to ensure that these emerging technologies are used to promote peace and security worldwide, and non-state actors do not use them to perpetrate evil. It is expedient that the international community is united in tackling the threats posed by emerging technologies.

[179] Lawrence Freedman, The future of war:a history (London: Allen Lane, 2017), p.xviii.
[180] Warren Chin, Technology, war and the state: past, present and future, International Affairs, Vol 95 Issue4 (July 2019).

Further Research

Should there be regulations and restrictions regarding the manufacturing and use of new technology? What effort should the international community make to curb the effect of emerging technology? Should the global community control individual manufacturing of emerging technology? How effective have exclusive export control policies aimed at addressing proliferation concerns in the context of scientific and technological innovations been successful? How should the international community respond if fully autonomous weapon systems which require no human intervention become more widespread?

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