



ماعت للسلام والتنمية وحقوق الإنسان
Maat For Peace, Development, and Human Rights

Briefing Paper

Threats and Concerns Arising from 3D-Printed Weapons Proliferation



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Overview:

This briefing paper addresses the issue of growing prevalence of firearms manufactured using 3D printing technology. It highlights the potential threats these weapons pose to security and peace within societies, particularly when they fall into the hands of criminal groups, extremist movements, and armed factions, especially in countries experiencing armed conflicts. Firearms are widely recognized as the primary tools used to perpetrate acts of violence and crime worldwide. Thus, this Paper aims to raise awareness among nations and advocate for preventive measures to ensure that this type of weapon does not end up in the wrong hands. It also provides an explanation of 3D-printed weapons, discusses the dangers associated with extremist groups obtaining them, specifically in European countries, addresses concerns related to their proliferation in regions plagued by high rates of firearm-related criminal activities or armed conflicts, outlines challenges associated with countering their spread and availability, and presents a set of recommendations aimed at strengthening controls on the production of firearms and their components using 3D printing technology, with the objective of mitigating their potential future risks.



Key Findings:

- The phenomenon of 3D-printed firearms has witnessed a surge since 2019, particularly in North America, including Canada and United States, as well as several European countries such as Germany, Sweden, United Kingdom, and Oceania region, notably Australia.
- Law enforcement agencies in various European countries have apprehended individuals with links to right-wing terrorism, who were found to possess weapon components produced using 3D printing.
- There are concerns regarding the future implications of proliferation of firearms created through 3D printing, including perpetuation of armed conflicts and an increase in criminal activities worldwide.

Introduction:

Continuous technological advancements in firearm production raise significant concerns regarding the ability to effectively monitor their global distribution and circulation, particularly considering their accessibility and low cost. Since the emergence of 3D-printed firearms in the United States in 2013, their presence has expanded into other countries, predominantly in Europe. This development poses a threat to the security and peace of many societies, as it allows individuals, criminal organizations, and extremist groups to assemble and produce firearms using 3D printers, once they possess the necessary computer and printing resources. This contributes to the proliferation of violent extremism and criminal activities.

The diffusion of these weapons heightens the challenges associated with tracking and monitoring their flow, as they lack the typical serial numbers found on conventional firearms. Consequently, they can be employed in criminal activities and acts of violent extremism without proper identification of the weapons used. Extremist movements can easily access 3D printers for the production of firearms, thereby jeopardizing the security and stability of societies. This has already been evidenced in recent years.

From the beginning of 2019 until the end of 2023, Maat monitored 16 cases

involving the reporting of 3D-printed firearms linked to the extreme right in several European countries, particularly Germany, the Netherlands, Sweden, the United Kingdom, and Finland. This poses a significant danger to citizens within society, particularly ethnic and religious minorities, and marginalized communities, as it facilitates the spread of violent extremism.

Furthermore, proliferation of firearms resulting from 3D printing hampers peace efforts in countries grappling with armed conflicts. The presence of these weapons prolongs conflicts by enabling armed groups to increase their production and may also exacerbate criminal activities, especially in societies with high rates of firearm-related crimes. While these concerns are pertinent at present, technological advancements may turn them into a reality in the near future unless countries pay attention and implement decisive measures to mitigate this phenomenon.

Concept and Characteristics of 3D Printed Firearms

3D printed firearms are defined as firearms produced either partially or entirely using a 3D printer. These weapons possess several distinctive characteristics, with the most significant being their ease of manufacture. Any individual with a computer and access to a 3D printer can produce this type of weapon. The process

entails obtaining the necessary weapon design, whether it be a pistol or a rifle, from the internet. Subsequently, the individual initiates the printing process, and the printer manufactures the various weapon components, which are then assembled.

Moreover, these firearms are relatively inexpensive. 3D printers are affordable, with prices often not exceeding \$240, and the required raw materials and additional equipment for the manufacturing process can be obtained for approximately \$190. This accessibility makes it easy for individuals to acquire these weapons. Additionally, these firearms lack serial numbers or other identifying features, making it challenging for law enforcement agencies to track, trace, and detect them. They have been used recently to produce lower receivers for rifles and certain types of submachine guns.

However, these weapons are characterized by low safety rates when used. A defect in the design or printing process can result in explosions or disintegration in user's hand before a single bullet is fired. The process of 3D printing firearms involves the layer-by-layer deposition of materials based on a digital design. The frame, barrel, and trigger are manufactured accordingly. Once all components are cured, they are

assembled to create a functional firearm. 3D-printed firearms durability varies depending on model and materials used in the production process. Current estimates suggest that approximately 80% of a firearm can be manufactured using 3D printers, while the remaining 20% consists of legally purchasable parts, such as barrels and firing pins.



Development of Proliferation of 3D-Printed Firearms

Initially, this phenomenon remains largely concealed, only surfacing when law enforcement agencies apprehend individuals involved in their production. Evidence gathered by Maat indicates a significant increase in the manufacturing of 3D-printed firearms in North America, including Canada and the United States, as well as in certain European countries such as Germany, Sweden, Britain, and Australia within the Oceania region. Technological advancements in these countries contribute to the alarming spread of this phenomenon. However, in Latin America, Africa, Asia, and the Middle East, the spread of 3D-printed firearms is relatively limited due to technological constraints and delays experienced by these regions.

The first instance of manufacturing a firearm using 3D printer technology occurred in the United States on May 5, 2013, with the production of the "Liberator" gun. Since then, this trend has grown steadily but has experienced a significant surge since the beginning of 2019. For instance, in February 2015, Australian police discovered 3D-printed plastic gun parts during a raid in the town of Mudjiraba on Gold Coast.

Throughout 2019, firearms manufacturing using 3D printers

witnessed a substantial increase. In 2021, Spanish police dismantled a workshop dedicated to printing 3D weapons in Tenerife, located in the Canary Islands. During the same year, Dutch authorities confiscated 3D-printed firearms on 14 separate occasions. In a notable investigation, a 3D weapons factory was seized in the Rhône region in November 2021. The authorities confiscated nine 3D printers, dozens of partially printed weapon components, and sets of metal parts used in the production of firearms. Furthermore, in December 2021, five suspects were arrested after the police discovered a cache of firearms and seized 3D printers.

In Sweden, during the first four months of 2023, the police confiscated nearly 20 weapons manufactured using 3D printers during house searches conducted across the country. Additionally, in June 2023, due to the growing use of 3D-printed weapons in criminal activities, the police made arrests...

In Canada, a security operation targeting manufacturers of 3D-printed weapons resulted in the arrest of 45 individuals and the confiscation of 440 weapons, including 3D-printed pistols, silencers, and long rifles. It is estimated that the confiscated 3D-printed weapons in Canada during 2023 accounted for 25% of the total number seized.

Furthermore, in November 2023, Australian police confiscated three 3D-printed firearms and ammunition during a house search in the Garan area. In February 2024, the Belgian judicial police dismantled a workshop owned by a couple in the city of Leuven that specialized in manufacturing fully assembled firearms using a 3D printer. The couple then offered these weapons for sale on the Dark Web. Dozens of metal and plastic weapons, as well as ready-to-use 3D-printed firearms, were seized.

Dangers of Extreme Current Possession of 3D Printed Firearms

Maat is deeply concerned about the potential for 3D-printed firearms to fall into the hands of extremist movements and groups. This concern is heightened by the arrest of individuals in several European countries who have been linked to right-wing terrorism and found in possession of weapon components manufactured using 3D printing technology. Some of these extremists seek to revive ideologies rooted in Nazi beliefs, advocating for the superiority of one race over others.

From 2019 until the end of 2023, Maat closely monitored 16 cases involving the reporting of 3D-printed firearms associated with far-right ideology. Within Europe, there has been a significant increase in interest in this type of weapon

among extremist groups, particularly in Germany, the Netherlands, Sweden, the United Kingdom, and Finland.

In July 2023, Finnish police announced the apprehension of a right-wing extremist cell comprising four individuals in the Lahti region. This cell had devised plans to carry out ethnically and racially motivated anti-immigration terrorist acts, utilizing 3D printers to manufacture a multitude of firearms and their components. Among the items seized by the police were four 3D-printed FGC-9 rifles. Furthermore, the cell had produced a compact pistol and converted a gas pistol into a functioning firearm.



In February 2022, a Dutch citizen was arrested for possessing 3D-printed firearms, weapon components, and a collection of Nazi flags. Upon examination by the Dutch police, it was discovered that a significant portion of the weapons were unreliable, exhibiting numerous defects and errors. In fact, some of them were prone to explosion when fired due to poor production quality and the use of substandard materials.

In Sweden, an arrest was made in November 2021 of an individual found in possession of explosive materials and 3D-printed weapon components. This person was identified as a former member of the Northern Resistance Movement, an extremist group. Additionally, incriminating documents associated with right-wing extremist ideologies were found in his possession.



In May 2021, three members of a far-right cell were arrested in Britain for attempting to manufacture the PG22, an improvised 3D-printed pistol, along with explosives. Similarly, in Spain, during September 2020, a 55-year-old man was arrested for operating a 3D-printing workshop. Inside the workshop, authorities discovered 19 3D-printed gun frames, various melee weapons, and precursor materials for explosives. The man was also found to possess over 30 far-right documents and manuals on urban guerrilla warfare, along with a wallet bearing a Nazi symbol.

In October 2019, in Germany, a 27-year-old white nationalist named Stefan Balliet killed two individuals using improvised weapons that incorporated 3D-printed components. This incident serves as a stark example of the accessibility of 3D-printed weapons technology, which could potentially fuel terrorist and extremist activities across numerous European countries.

Concerns Over Proliferation of 3D-Printed Firearms in Armed Conflicts and Criminal Activities

Availability of 3D-Printed firearms could perpetuate armed conflicts and impede peace-building efforts. The affordability and untraceable nature of 3D-printed firearms provide armed groups with an avenue for cheap weapon

production, evading detection by law enforcement agencies. Although the current situation suggests limited deployment of these weapons in conflict-ridden countries, advancements in technology raise alarming concerns about armed groups adapting and utilizing this technology, thereby prolonging conflicts.

In 2021, substantial evidence emerged confirming that fighters from the People's Defense Forces in Myanmar have been producing 3D-printed firearms to combat the military junta in the country. Members of the movement have shared images of weapons manufactured using 3D printers, with the FGC-9 weapon being particularly notable. This 9mm plastic pistol is sold for approximately 88 euros, further contributing to the continuation of the ongoing armed conflict.

In Ukraine, citizens have utilized 3D printing technology to produce bombs. While these are not firearms, the availability of this technology to citizens and armed groups raises concerns about the potential future production of firearms using 3D printing. This could prolong the conflict. Between April and August 2023, Ukrainian citizens produced over 30,000 bombs using this technology to support Ukrainian forces in their war against Russia.

On a different note, there are significant worries about criminal gangs and drug trafficking organizations exploiting 3D printer technology to manufacture firearms. Various human rights advocates have expressed fears regarding the proliferation of 3D-printed firearms among criminal groups in Brazil, particularly after images surfaced on the internet. Certain weapons, such as the FGC-9 pistol, which can be utilized by organized crime groups, pose a threat in countries experiencing a surge in armed violent crimes. Similar concerns exist regarding the spread of these weapons in Mexico, Chile, and Venezuela, following individual attempts by criminal groups to acquire this type of weaponry.

We cannot afford to wait for these legitimate concerns to materialize. States must take proactive measures to implement controls that prevent 3D printers from falling into the wrong hands, as they have the potential to be used for human rights violations and breaches of international humanitarian law. Firearms are frequently used as tools by violators of human rights worldwide.

Conclusions and Recommendations

Technological advancements in producing firearms using 3D printers pose an imminent danger that undermines societal stability and security. 3D printing has progressed from a potential means to an actual method of illegally manufacturing firearms, thereby jeopardizing human rights, particularly when this technology falls into the hands of organized crime groups, terrorist movements, armed groups, or extremist organizations that threaten democracy. The risk of instability and security threats within societies is exemplified by the mere possibility of this technology reaching an extremist individual in Yemen who does not uphold democratic values. To mitigate this phenomenon, Maat recommends the following:

- Lawmakers in countries should strengthen controls on manufacturing of firearms and their components using 3D printing technology, particularly crimes related to the dissemination and possession of firearm blueprints on the internet.
- Law enforcement agencies need to receive training to effectively identify weapons manufactured using 3D printing technology.
- Countries should prohibit export of this technology to nations with high rates of organized crime, unless specific guarantees are in place to ensure it does not fall into the wrong hands.
- Restrictions should be imposed on materials and goods commonly used in 3D printing firearms.
- Development of 3D printers equipped with safeguards that prevent the printing of certain weapon-related designs is necessary.
- Promotion of responsible 3D printing practices and public education about the dangers associated with 3D printed firearms is crucial.
- Encouragement of cooperation between countries to exchange information on firearm schemes and illicit firearms trade conducted over the internet.
- Support for civil society organizations to enable them to play a role in reducing the illegal use of 3D printers for firearm production.
- Countries should work with private sector to establish measures that include tracking 3D-printed firearms.

Resources

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