Future use of Lethal Autonomous Weapons (LAWs) by criminal Non-State Actors, and its possible effects on governance, national security and democracy. A futures studies analysis for the case of drug cartels in Mexico in 2050

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Abstract*

The use of Lethal Autonomous Weapons (LAWs) by criminal groups in the future is a real possibility. In countries with weak institutional environments, like México, conditions seem very prone for criminal Non-State Actors (NSAs) like drug cartels (DCs) to have access to and operate these weapons in the future. They have the money, organization and access to knowledge to acquire them and be willing to operate them. Current signals and trends show that this danger is real, since drug cartels have already used drones armed with explosives, in scattered attacks on police forces since 2020, in territories like the state of Michoacán. This situation represents a significant challenge for the Mexican state and its institutional armed and security forces. What would be the possible effects of drug cartels gaining access in 2050 -or sooner- to LAWs? How would their possession by these criminal groups affect governance, institutional order, national security and even democracy in Mexico?

Using futures & foresight methodologies such as horizon scanning and scenario planning, this paper presents some probable and plausible scenarios of using LAWs by drug cartels, and its possible consequences for governance, national security, and democracy in México.

The objective of this paper is that the depicted futures scenarios for 2050 can become a small contribution to analyzing, devising and implementing anticipatory measures in the present, that may be useful for the Mexican government and its armed and security forces to prevent, and hopefully avoid, this menace.

"The potential benefits of artificial intelligence are huge, so are the dangers".
(Dave Waters)

In recent times in different regions of the world, drone technology has been used by criminal Non-State Actors (NSAs). For example, the Houthi rebels in Yemen have used armed drones, and ISIS in Iraq and Boko Haram in Nigeria have used drones with explosives (Hanner & Garcia, 2019). In Mexico, news

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reports since 2020 described different attacks directed at police officers in the state of Michoacán, carried out with drones containing C-4 type explosives (El Universal, 2020), allegedly perpetrated by members of the "Cartel Jalisco Nueva Generación" (CJNG). One year later, in April 2021, the use of similar devices by this criminal group was reported again in that same Mexican state (Gutiérrez, 2021). Although these devices do not operate with Artificial Intelligence (AI) technology, they are worrying because they indicate a new modality used by criminal groups to attack state forces: the use of remote-controlled technology. More advanced devices with semi-autonomous and autonomous AI technology are available in the international market for whoever has the financial means to obtain them. Potential buyers include governments, security forces, national military forces, and NSAs from around the world, including criminal groups like drug cartels (DCs).

This situation is particularly worrying for developing countries with weak institutional environments, such as Mexico. Mexican DCs have financial wealth, organizational capacity, ubiquity, and logistics, and that represents a major challenge for the national government, the armed forces, and police institutions. Some political analysts even suggest that DCs hold total control over some territories of the country (Ferri, 2021). DCs already have access to high-powered weapons and technology, and given their wealth and corrupting power, there is no reason to think that they will not be able to access LAWs and other AI devices in the future, with unknown negative effects on the country's governance, institutional order and national security.

What would be the potential effects in the future if DCs gain access to LAWs? What would this mean regarding governance and national security in Mexico? These are some of the questions addressed in this work. Using futures & foresight techniques like horizon scanning and scenario planning, some plausible futures scenarios are depicted as a speculative exercise to imagine what could be the potential effects of a situation like this in the long term (year 2050), and above all, how can the negative effects and consequences of DCs getting access to LAWs to be anticipated and avoided.

Hypothesis: In Mexico, criminal Non-State Actors (NSAs) like DCs will have access to technology developments such as LAWs in the future, augmenting the power of these criminal groups and increasing their negative influence over governance, stability, and national security of the country.

Methodology. The structure of this work is as follows:

- Analysis and discussion.
- Horizon Scanning.
- Location of Drivers of change and critical uncertainties employing a STEEP analysis.
- Generation of Scenarios using the 2x2 Matrix Method.
- Narrative of Scenarios. Year 2050.
- Conclusions.

Lethal Autonomous Weapons (LAWs). What are they?

In its most basic form, an Artificial Intelligence (AI) is a system capable of making decisions autonomously (Webb, 2019). Autonomy is always made up of the same three conditions: sensitivity, decision, and action (Boulanin & Verbruggen, 2017). For these characteristics, AI is already considered "the next great military advantage in the world" (Knight, 2019).

There are many definitions of what LAWs are. The United States Department of Defense describes an autonomous weapon system as a weapon that, once activated, can select and engage targets without further intervention from a human operator (Boulanin & Verbruggen, 2017). Human Rights Watch considers these weapons to be robots capable of selecting targets and emitting force, without any human intervention or programming (Boulanin & Verbruggen, 2017). The British Ministry of Defense defines LAWs as a system that is "capable of understanding a higher level of intention and direction. From this understanding and its perception of the environment, such a system is capable of taking the appropriate measures to produce a desired state. It can decide a course of action from a series of alternatives without relying on human supervision and control, even though these may be present" (Boulanin & Verbruggen, 2017). It is worth emphasizing that based on the above definitions, to this day human intervention remains fundamental to the operation of LAWs, particularly in programming the targets they will target, track or attack.

The Power of Mexican DCs

On October 27, 2019, the city of Culiacán, , the capital of the Mexican state of Sinaloa with about 800,000 inhabitants, was besieged by groups of armed people. National T.V. networks and several videos on social media showed how these armed groups quickly put the city upside down: buses set on fire in the streets as barricades; convoys of vehicles with people on the top of them carrying heavy weapons, including rocket and grenade launchers (De Córdoba, 2019; Luhnow *et al.*, 2019); shootings in various areas of the city, and so on. It was later revealed that these armed groups allegedly belonged to the Sinaloa Cartel, one of the largest DCs in Mexico and the world[1]. This event revealed the power that DCs have achieved in Mexico, with increasingly open, recurrent, and violent armed activities, and with firepower probably superior to that of the State forces.

According to some versions, DCs seek to establish their control over "zones of impunity" throughout the country (Manwaring, 2009), rivaling the Mexican state through the establishment of "semi-autonomous political enclaves", au-

[1] Something similar occured again at the beginning of January 2023.

thentic "free micro-states" within the state itself where these criminal groups do something close to the concept of "govern". In the Weberian sense of the "state monopoly over the legitimate use of physical force over a given territory" (Weber, 1946), the Mexican state is already facing problems, since DCs apparently have already established some of these zones of impunity in territories like the state of Michoacán.

In addition, Mexican DCs exert enormous financial power. Ríos (2008) refers to the fact that most reliable estimates consider annual profits for Mexican DCs in a range between 3.2 and 9.9 billion dollars, figures consistent with those reported by O'Grady (2019), who estimates annual profits of 10 billion U.S. dollars, coming solely from their operations in the United States of America. Financial power of DCs is relevant because it guarantees availability of assets, including high-power weapons with advanced technology that rival and may even be superior to those possessed by Mexican armed forces. Military analysts have pointed out that future combatants in the world, both NSAs and state forces, are already investing today in autonomous AI systems (White Jr., 2017) and could do so in similar devices: facial recognition and automatic location systems; drone swarms; Autonomous Unmanned Vehicles (UAV); exoskeletons; remotely operated tanks and humanoid robots (Braun *et al.*, 2018; Brundage *et al.*, 2018; Keenan, 2014; Swofford, 2019; White Jr., 2017).

Are these conditions likely to incentive Mexican DCs to acquire LAWs? The next part of the work will present some answers to this question.

Horizon Scanning

Horizon Scanning can be used to explore new or unexpected issues but also persistent problems, trends and weak signals that are occurring in the present and could anticipate the occurrence of certain specific situations in the future (van Rij, 2010). Horizon scanning may include desk research, focus groups, and expert surveys or questionnaires (Édes, 2020).

Two horizon scanning techniques were used for this work:

1) A questionnaire aimed at professional and academic experts in specific areas of knowledge related to the topic of research.

2) A record of signals searched and registered from documentary sources such as newspapers, specialized journals and magazines, websites, social media, etc., in a period from December 2019 to June 2021.

Application of a questionnaire to experts

A questionnaire of 13 questions was prepared, presented, and answered to 11 persons between June 12 and July 24 of 2020, all of them experts and professionals in specific fields of knowledge relevant to the topic of this work: National Security; Public Security, Artificial Intelligence, Technology, Cyberse-

curity and Organized Crime/Drug Trafficking. Given the subject matter of the questions and the research, and to safeguard the integrity of the experts, the questionnaire was answered anonymously. The experts' professional activities and fields can be found in Appendix 2.

The following findings stand out from this exercise:

1) Out of 11 experts, 5 of them were experts in Artificial Intelligence (1 of them also said he was expert in Public Security and Safe Software Development). The others were: 1 expert in Homeland Security; 1 in Organized crime and Drug Trafficking; 2 in Public Security; 1 in Human Security, Assistance to Victims and Humanitarian Disarmament; and 1 more in Cybersecurity and Cyber Defense.

2) 45.5% of the experts stated that in their knowledge, there were no specific AI technologies being currently used by DCs in Mexico or abroad; 36.4% said they did not know, and 18.2% said CDs already use them already, consisting of:

"*Almost unbreakable communication encryption technologies, intelligent telecommunications networks (calls and messages that notify pilots or captains when it is safe to move cargo), ultra-light aircraft, data science to avoid detection*", and

"Irrigation systems with drones for illegal plantations. Facial recognition systems".

3) Regarding awareness of the current access to LAWs or any other type of AI weaponry by DCs, 90.9% of experts said they did not know, and 9.1% considered they do not have them yet.

4) Experts were asked if they believe that Mexican DCs will have access to AI technology weaponry at some point in the next ten years. It was an open question, and all eleven experts unanimously answered "yes": at some point the cartels will possess this technology. They mentioned several reasons for this:

"Yes. AI technology is expanding rapidly and is not exclusive."

"Yes. The accelerated advance of ICTs allows people belonging to organized crime to have access to this type of equipment in, for example, the deep web or other black markets."

"Yes, due to its ability to finance and import weapons from foreign countries."

"Yes, I think that perhaps they already have or will have access to weapons with AI technology (whether or not they use it in their operations, is another question). It is very easy to buy weapons, especially for these types of organizations. I think they value technology, and they always try to be one step ahead of the authorities."

"Yes, drug cartels are highly adaptable to the innovation process, and this will be more affordable."

"Yes, many times they are more advanced, and they have entire strategy teams to maintain their businesses."

"If these weapons were developed, it would be possible that they will be in the hands of illegal groups or non-state armed groups in a short time."

"We are seeing an approach towards technologies by DCs."

5) When asked if they consider the Mexican government has the means to deal with the possible use of weapons with AI technology by DCs, 72% answered "no", citing reasons such as lack of access by the Mexican State to this type of technology; lack of institutions that promote professionalization of security agents in this type of areas and technology, and lack of government coordination in the matter; also lack of financial resources to invest in technology to counterattack this type of weaponry, and lack of a cybersecurity strategy; little approach to technology, or lack of interest on it.

6) Experts were also asked if they consider that military and security forces of the Mexican government (Army, Navy, National Guard, municipal and state police) are preparing for the future possible use of weapons with AI technology by DCs: 45.5% considered they are not; 27.3% said they did not know, and another 27.3% considered yes, they are currently preparing.

One of the experts who answered yes, mentioned the following:

> Unfortunately, among all security institutions you mention, there are stratospherically different capacities. At the federal level I can trust that, with regard to the functions it performs, the Navy must be at the forefront in this regard, by virtue of the training of its members, many of whom studied abroad, mainly in the United States. As far as the National Guard is concerned, I highly doubt it, since it is an institution in process of transition and consolidation. The Army has certain sections in which intelligence is generated, so it is likely that they already foreseen the AI issue. Both the Navy and the Army have their respective educational centers (CESNAV and Colegio de la Defensa), whose academic programs are similar to foreign programs in which they necessarily study these subjects, an issue that for them constitutes an advantage. It will be necessary to analyze the efforts of the CNI (National Intelligence Center) in this regard. At the state and municipal level, efforts are scarce, if not null.

7) When asked if the Mexican government has an agenda for the development of AI technology to combat organized crime, 54.5% of the experts said "no", 36.4% said they did not know, and only 9.1% answered "yes".

8) Another question was how necessary they consider that the Mexican government (at the federal, state, and municipal level) designs a strategy to prevent the possible use in the future of autonomous weapons with AI technology by DCs. 72.7% of them answered it is "very necessary" or "somewhat necessary".

9) Significantly, 90.9% of the interviewed experts considered that possible use of weapons with AI technology by DCs, would represent a risk for governance and institutions in Mexico.

Scanning horizon by reviewing and analyzing information from verified websites and social media, journalistic notes, and documentary sources

The second method of horizon scanning was the collection of signals and

trends related to three fundamental topics: 1) Lethal Autonomous Weapons; 2) Artificial Intelligence for military uses; 3) Use of technology by drug cartels in Mexico and the rest of the world.

The primary objective of this part of the work was to complement the information obtained through the interviews described in the previous part of the work.

Information was collected from various sources: specialized academic journals and popular magazines; reports from national and international newspapers; websites and social media posts. The information was registered in a Microsoft Excel® database generated between June 2020 and the first week of June 2021.

Collected data showed the following signals and trends:

Some territories in Mexico are apparently under control of the DCs, or in dispute with governmental forces. An emblematic example is the Municipality of Aguililla, Michoacán, a 15,000 inhabitants city where the Spanish newspaper "El País" speaks of the "disappearance of the Mexican State" (Ferri, 2021). Another case is Reynosa, Tamaulipas, where according to media reports of June 2021, the organized crime executed at least 18 persons (Reina, 2021). These signals are also worrying due to the risk of a similar situation spreading to new territories. This, in addition to strategies of persuasion and "soft power" used by DCs in a number of towns, like delivery of provisions, money, legal and illegal jobs, and the construction of infrastructure such as roads, hospitals, schools, among other practices documented in Mexico for years (Mrad, 2009) that allowed DCs to get allies in different towns of the country, even during the midst of the COVID-19 pandemic (Dittmar, 2020).

Direct attacks have occurred to state police officers and other public security authorities using drones armed with explosives, and with increasing frequency since 2020. Furthermore, evidence found in these attacks and as declared by Mexican military authorities (Gutiérrez, 2021), showed that they were perpetrated by the CJNG. Although these devices are still far from being considered LAWs, they constitute signals that DCs are already employing advanced technological innovations in their armed incursions.

LAWs are being manufactured by more countries now. Current manufacturing leaders are the United States, China, South Korea, and the European Union (Haner and Garcia, 2019). Turkey (Tekingunduz, 2021) has also become a major manufacturer and seller.

Technological advances in AI weaponry for military use are rapidly developed and are already being used by armies around the world, both in exercises and in the battlefront. The French Army has incorporated "*Spot*" to its training sessions, a dog robot with AI capabilities created by the US firm Boston Dynamics, and it is evaluating its usefulness in future war situations (Vincent, 2021). The Russian army has announced the development of its first AI military robotic unit, that they have already put to the test in military operations in Syria

(McDermott, 2021). The United States government has created "*Skyborg*", an autonomous AI that can fly independently and take decisions by itself to attack enemies and defend its operator (Díaz, 2021).

These technological developments could be at reach of the DCs in the future, given their historical ability to acquire the highest technology weapons available on the illegal and legal markets.

In a document prepared by the Libyan Panel of Experts and addressed to the Security Council of the United Nations Organization (United Nations Security Council, 2021), it was reported that lethal autonomous weapons with artificial intelligence -specifically STM Kargu drones, as well as unmanned aerial combat systems for intelligence, surveillance and reconnaissance tasks such as the Bayraktar TB-2 and probably the TAI Anka S, all of Turkish manufacturing, were used by the army of that country in March 2020 against Libyan rebel forces. The document establishes that "*lethal autonomous weapons systems were programmed to attack targets "without requiring data connectivity between the operator and the ammunition…*" and continues saying that their use by the Turkish army was a decisive element for the defeat of its adversaries, who "*were neither trained nor motivated to defend themselves against the effective use of this new technology*".

When it comes to technology, DCs resort to methods like the extorsion or kidnapping of experts to operate it. More recently, DCs are also recurring to hire university students and professors as their employees to serve their criminal purposes (Infobae, 2022), and this surely may be replicated for LAWs' operation in the future.

Drivers of change and STEEP analysis

As a result of the Horizon Scanning process previously described, ten drivers of change were obtained (Table 1). Each one of them was classified using a STEEP analysis, describing Social (S), Technological (T), Economic (E), Environmental (E) and Political (P) aspects (Figure 1). These drivers of change are very important because they represent the fundamental input for the creation of scenarios that will be described in the following section.

Building scenarios to the year 2050

The foresight technique used for the creation of scenarios for 2050, is known as the 2x2 Matrix, whose creation was formalized in the 1990s by the consulting firm Global Business Network (Rhydderch, 2017). Following this methodology, drivers of change generated in the previous section were weighted, locating them in a plane in which two axes were drawn, one horizontal and one vertical, based on their greater or lesser degree of uncertainty and impact that they are expected to have in the future if they occur. The results are illustrated in Figure 2:

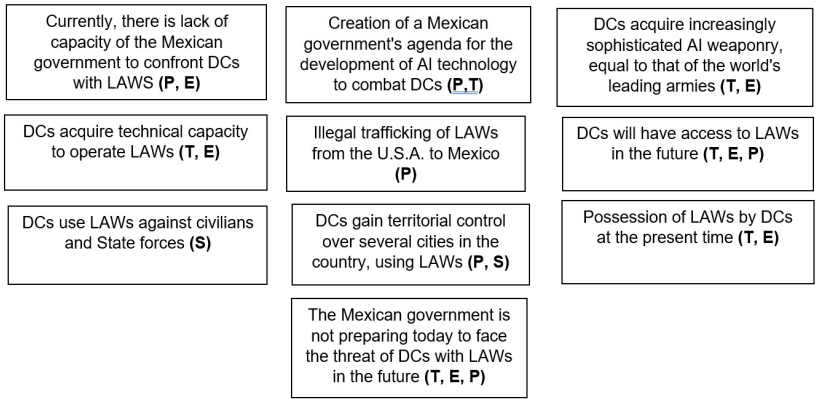
Table 1
Drivers of change derived from Horizon Scanning.

1)	Control of some areas of the country by DCs. Communities and towns support DCs as they receive food, money and infrastructure like schools, hospitals, highways, etc.
2)	The use of LAWs and other AI technology is a reality for some armies around the world.
3)	Use of increasingly sophisticated weapons and technology by DCs.
4)	LAWs in the hands of DCs would represent a danger to governance, institutional framework and national security in Mexico.
5)	It is imperative that the Mexican government designs a specific policy against the possible use of LAWs by DCs in the future.
6)	It is unlikely that the Mexican government will develop an agenda for the development of AI technology to combat organized crime.
7)	It is uncertain if the Mexican armed and security forces possess any kind of preparation for the potential use of LAWs by DCs in the future. Only Navy and Army, and perhaps Federal security agencies, may be doing it. It can be safely assumed however, that this is definitely not occurring at the level of state and municipal governments, which are basically defenseless against this menace.
8)	The Mexican government does not currently have the capacity to deal with the possible threat of future use of LAWs by DCs, either due to access to the proper technology, or institutional problems.
9)	DCs will eventually have access to Lethal Autonomous Weapons.
10)	There is no data to confirm that DCs already possess LAWs but based on their confirmed use of emerging technologies like drones with explosives, there is a high probability that they are at least trying to obtain them and to develop capacity to operate them.

Source: Own elaboration

Tab. 1 – Drivers of change

Figure 1. Drivers of change and STEEP Analysis



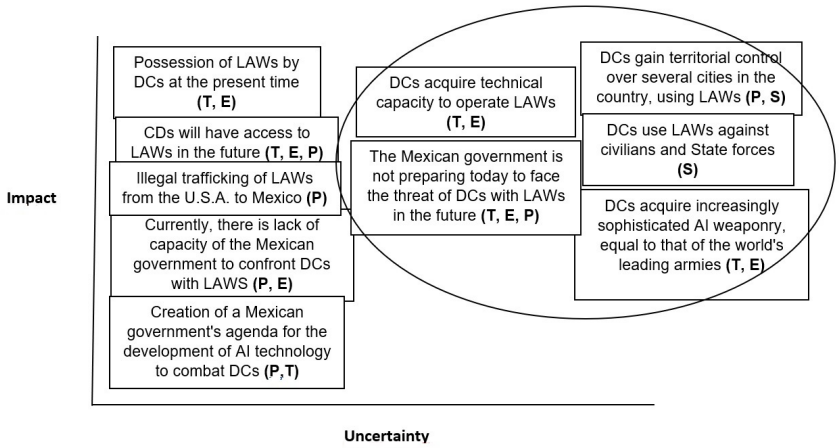
Source: Own elaboration

Fig. 1 – STEEP Analysis

The objective of this exercise is to establish critical uncertainties, those generators of change with the greatest degree of uncertainty and at the same time, the greatest impact if they were to occur. In this case, the five elements with these characteristics are the circled ones in Figure 2.

Once critical uncertainties were established, two of them were selected to use them for the creation of scenarios (Figure 3):

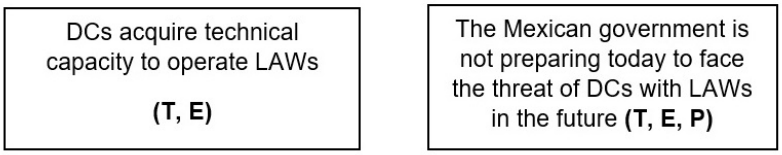
Figure 2. Critical uncertainties



Source: Own elaboration

Fig. – 2x2 Matrix

Figure 3. Critical uncertainties

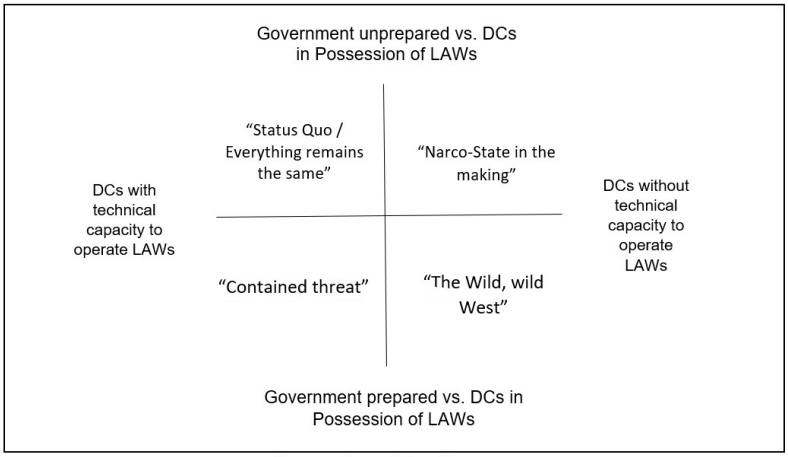


Source: Own elaboration

Fig. 3 – Critical uncertainties

Both critical uncertainties were located on two axes, constructing a polarity along them in such a way that totally opposite situations were located at each end. The result appears in the four scenarios shown below, in Figure 4:

Figure 4. Scenarios for Year 2050



Source: Own elaboration

Fig. 4 – Four scenarios

Narrative of scenarios: Year 2050.

"Narco-State in the making"

Based on their greater fire power with LAWs and their ability to operate these advanced weapons, DCs have won the battle over state forces for control of more than 1,700 municipalities and at least 11 states in the country, according to estimates from the press.

From at least 2023, the country's military and naval forces do not have the budget, the technological tools, or the support of the Mexican government to develop counterattack strategies, and neither have sufficient material, logistical, or strategic elements to combat DCs and their LAWs, which by the way have been consistently used in various armed incursions throughout the country. Desperate, the Mexican government has chosen to seek a way of negotiating with DCs to pacify the country.

There is a virtual state of siege after the federal government decreed a national state of emergency and a curfew starting at 8 pm, throughout the country. Schools have been working fully on-line since last year. There is a tense calm throughout the country and the Mexican population has chosen to accept the situation, to safeguard their well-being and that of their families.

The presidential administration has made it a priority to develop an agenda to combat the use of LAWs by organized crime. However, the lag is very wide and various analysts doubt that this can have a positive effect now or reverse the current situation.

Besides, it has been detected a gradual seizure of political positions by legal and electoral means in local and state governments, by members of the organized crime. When that does not work, political posts are achieved through the use of force, blackmail or extortion. Municipal presidents, governors, and members of the Mexican Congress are part of the permanent list of cartels' collaborators.

Various international agencies, media and human rights organizations, have little doubt that the presidential candidate who overwhelmingly won the 2048 election, and today in 2050 holds the executive power, has direct links with the DCs.

"Status Quo / Everything remains the same"

Although LAWs are used in practically all war fronts in the world, and have been for several years now, Mexico remains kind of an island in this sense. There are no reports of the use of LAWs in the country, and neither on the possession of them by any criminal group operating in the nation.

Previous governments and the one that won the very disputed presidential election of 2048, two years ago, decided that investment in human and financial resources to prevent a possible acquisition and use of LAWs by Mexican DCs, was not a priority for the Mexican state. They thought that other items required more attention, such as all health and economic expenses generated by the three pandemics that occurred during the 2030s-2040s. They also expressed that the probability of organized crime getting LAWs or being able to operate them, was very low.

Time seems to have proved them right: at least until the year 2050 there is no report, not even in the recently opened confidential files by order of the National Institute for Access to Information (INAI), or in any part of the military confidential documents revealed through the recent event known as the "Panda leaks" information scandal, that mentions the use of LAWs by organized crime in one of its armed incursions in the country. While the DCs have high-tech weaponry, organization, money and logistics, they have not been able to learn how to operate LAWs, which has so far prevented them from using them.

However, DCs face the Mexican state forces with high-caliber weapons, that continue to arrive from illegal markets and especially from the U.S.A. Confrontations continue to take place and DCs seem to advance in the control of some areas of the country, generating an increase in the number of deaths and violence for the last 10 years, according to official figures. Governance of the country is complicated and constantly questioned by political opposition groups, civil society, international media and organizations, in the face of such violence and with the virtual occupation of territories by DCs, a fact that cannot be concealed by the international community.

The Mexican government declares that so far is "satisfied" because at least up to now, fortune has been on its side, and the extensive use of LAWs in armed conflicts around the world, including their reported operation by non-state criminal actors and terrorists in other latitudes, have not reached the country. They hope to continue to be that lucky.

"Contained Threat"

The Mexican government assumed the task of allocating financial and human resources for the creation of a comprehensive Artificial Intelligence agenda from the year 2023, and since then it has developed a complete program that included the creation of a special Committee with the mission of designing a long-term strategic plan, to prevent the use of artificial intelligence weaponry by DCs and establishing measures to prevent and counter this threat.

Personnel from state and municipal police bodies, the Navy, the Army and the National Guard, participated in the creation of the strategy, in addition to organizations such as the National Council for Science and Technology (CONACYT) and a consortium of public and private universities of the whole country.

The *Strategic Plan for opportunities and threats posed by the use of Artificial Intelligence in Mexico, 2050* ("The Plan") was first published in 2025, and since then a specific governmental program has been allocated with budget resources each year to carry out the strategic actions contained therein. Thanks to that program, the Mexican State was not only able to timely anticipate the eventual acquisition and use of LAWs by DCs, but also established national and international cooperation mechanisms with foreign governments and agencies, which together have contained this threat, at least until now in the middle of 2050.

As part of "The Plan", the Mexican government acquired the necessary technology, training and operating capabilities to combat DCs more effectively and efficiently. As a result of this, since 2026 there has been a drastic decrease in the levels of violence in the country caused by drug trafficking actions, and it has been possible to recover of some territories that were *de facto* controlled by these criminal groups before that year.

The Mexican government continues the application of "The Plan", which registered its third update in 2042. Thanks to this, Mexico stays at the forefront of Latin America as one of the most advanced nations in terms of the use and operation of AI, particularly for purposes of security and the fight against organized crime. Mexico continues to advise several countries on this matter, and the country is a mandatory worldwide reference on the matter.

The Mexican government and its institutions have not lowered their guard regarding the monitoring of the activities that DCs may be carrying out to acquire and operate LAWs and other similar devices. The threat remains latent, but thanks to "The Plan" and the coordination among various security and military agencies in the country, as well as with international agencies and organizations, for the moment the threat seems controlled. But at any moment the situation could change, so they know they can't let their guard down.

"The Wild, wild West"

Since 2023, the Mexican State has done its work and developed a comprehensive long-term agenda depicting opportunities and threats for the country

derived from the use of AI and established a task force with enough budget and human resources, to take charge of this agenda. The task force was made up of personnel from municipal and state governments; police, SEDENA, SEMAR and the National Guard. These agenda and task force were very important to ensure that the Mexican State had the necessary preparation to anticipate the threat of the use of LAWs by DCs, and to be able to get ahead of them.

However, and as trends indicated from years ago, DCs gained access to LAWs and other high-tech weapons practically from that same year 2023. At first they did not know how to operate them and spent a great amount of resources and time in finding how to achieve it; but first through the kidnapping and extortion of scientists and experts who taught them how to operate them, and then through the hiring of foreign expert operators and the development of their own scientific and technological capabilities that allowed them to have their own "expertise" since around the year 2024, DCs achieved equality of circumstances with the forces of the Mexican government in terms of firepower, strategy, logistics and organization.

The foregoing translated into the beginning of a large-scale war between the Government forces and the DCs, which continues to this day and seems to have no end, with both parties making extensive use of LAWs and other AI devices. This has generated many victims, unfortunately among the civilian population, as well.

Given the situation of generalized violence in the country that intensified with the use of LAWs, at least since 2024 a large wave of Mexican citizens began to move illegally to the United States, Canada, Central and South America and even some European countries like Spain, seeking to escape from the situation of authentic violence and large-scale war in Mexico. By 2050, it is estimated that more than 1,000,000 Mexican nationals have fled the country in the period 2024-2050, due to the long situation of violence.

Governance in the country is under constant questioning and national security is at high risk, given the outstanding strength of DCs and the fact that it seems to have infiltrated the institutional bodies of the Mexican government at all levels. However, having anticipated the acquisition and operation of LAWs by DCs was an important issue to be able to develop the elements necessary to avoid a major disaster, and to maintain institutionalism in the country until now; although literally, "with pins".

Conclusions

This paper employs futures & foresight as a methodology to visualize in the present, the possibility of criminal activities derived from the criminal use of LAWs in Mexico in the future. It sought to set a precedent in the study and analysis of the effects of potentially negative future actions derived from the

malicious use of AI technology by criminal NSAs, which may generate further investigation. The topic presented and its approach to foresight & futures studies methods need to be understood and disseminated, to see in a proper dimension the value of the potential contributions of this discipline to the knowledge and implementation of more effective public policies that incorporate the anticipation factor.

Results of this research suggest there are strong possibilities that at some point in the future -and not very far from now- DCs will acquire and use LAWs in their operations, which confirms the initial hypothesis of this work. The use of these devices is becoming a global trend on various battle fronts and there is no compelling reason why Mexico could be an exception to this situation, even less, considering history with other types of weapons illegally trafficked to Mexico from the United States, for example, that DCs currently use in their day-to-day operations. The Mexican government must prepare from today for it, as if it were already a fact, to anticipate the possible and multiple negative effects of a situation like it.

Interviewed experts for Horizon Scanning unanimously agreed on two issues: 1) At some point in the future and with all certainty, Mexican DCs will acquire and operate LAWs in the country; and 2) the Mexican Government is not prepared for that today, and at the moment there is not even a glimpse of intention to achieve such preparation, especially among the police forces and in particular at the municipal and state level, where the greatest vulnerability is observed. Experts interviewed also agreed that the possible use of weapons with AI technology would represent a risk for governance and national institutions.

The four scenarios proposed here show that there are worrying effects resulting from the possible acquisition and operation of LAWs by Mexican DCs. This essay only seeks to make the problem visible, but further work must be done on the elaboration of a greater number of potential futures scenarios, and using critical uncertainties different from those proposed here, so that a broader panorama of what could happen in the future is visualized and can be used to act in consequence.

Finally, access to AI technology by Non-State Actors like criminal groups is an issue that could be spread internationally very soon and quickly become a real nightmare, if governmental action worldwide is not taken today to prevent it.

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Appendix

Experts responding to questionnaire on uses of artificial intelligence

Given the specific topic of this research, the identity of experts who answered the questionnaire is preserved. Only their occupation is mentioned, and in some cases the organization to which they provide their services. Out of the 11 experts who answered the questionnaire, 5 considered themselves experts in Artificial Intelligence (1 of them also said they were experts in Public Security and Secure Software Development); 1 in Homeland Security; 1 in drug trafficking and organized crime; 2 in Public Security; 1 in Human Security, Assistance to Victims and Humanitarian Disarmament; and 1 more in Cybersecurity and Cyberdefense.

- Researcher and Director of a Graduate Program at the Centro de Investigación y Docencia Económicas A.C. (CIDE, a public university and academic research center).
- An expert with a master's degree in National Security, from a University in Israel.
- Expert in Cybersecurity and Computer Crimes.
- Academic Researcher, member of a Security Studies Center at the Instituto Tecnológico Autónomo de México (ITAM, a private university and academic research center).
- Representative in Mexico of an international victim assistance and humanitarian disarmament organization.
- Expert in Artificial Intelligence (AI) and Assistant Professor at a University in the United States of America.
- Expert in AI, Public Safety and Secure Software Development. Employee of a private software development company.
- Expert in Artificial Intelligence, Director of a bachelor's degree Program at a private University in Mexico.
- Expert in Artificial Intelligence. Member of the Mexican Society of Artificial Intelligence (SMIA). Professor and Academic Researcher at a private university in Mexico.
- Expert in Public Security issues, professor at a Mexican Public University.
- Expert in Artificial Intelligence, collaborator in a private advisory company of Technology in Latin America.