

Terrogence Möbius Report

Progression of Improvised Payloads for Armed UAVs, Mexico, 2023

Counter Improvised Explosive Device (C-IED) Report Assessed by Chief Superintendent (ret.) Michael Cardash



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Summary

On December 2, 2023, residents of the village of El Parotal, in Guerrero State, reported they had downed two UAVs used in armed UAV attacks by the La Familia Michoacana cartel against their village and other communities in the mountainous municipality of Petatlán.

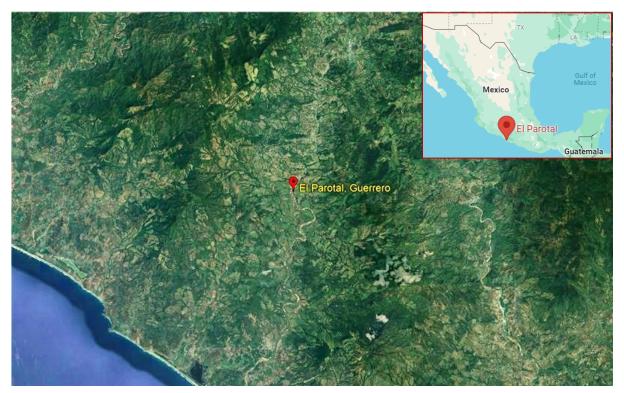
The recovered UAVs, one of which locals had taped back together, were documented in a video published on December 9, 2023, alongside an improvised bomblet that had failed to initiate.

Comm. Info

Documentation of the downed UAVs and the unexploded improvised bomblet was documented in a video published in Mexican media on December 9, 2023. The documentation of other armed UAVs, their different payloads, and weapons caches that included improvised bomblets was published in Mexican media during the period January thru December 2023.

Numerous styles and types of improvised bomblets have been evidenced in different parts of Mexico in the last year, including a series of "new generation" bomblets, one of which is reportedly chemical dispersing. According to local reporting, around 30 such improvised bomblets have been used in attacks against civilians already in 2023.

Mexico is the country with the largest number of criminal-related armed UAV attacks in the world. During the last three years, the size and number of improvised bomblets used in these attacks has both increased and progressed.



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Analysis

According to residents of El Parotal, situated in the mountainous municipality of Petatlán, on Mexico's Pacific coast, since May 5, 2023, the La Familia Michoacana (FM) cartel has targeted communities along the Santa Rosa-El Durazno mountain route in the Sierra Petatleca, specifically in the towns of El Parotal, La Mona, El Camarón and Las Mesas, with hundreds of armed UAV attacks because they have refused to pay extortion fees to the cartel. Several people have been killed in these attacks and many more were injured, in addition to damage to buildings, vehicles and livestock.

According to eyewitnesses, after one of the UAVs released its payload, it caught fire and crashed near a stream. They retrieved it and extracted a USB flash drive containing documentation of different attacks it had perpetrated. The memory card shows the cartel members launching and controlling another armed UAV.

This UAV, which the local community members taped back together, was documented alongside an improvised bomblet, which had failed to initiate.

The second UAV was shot down by residents in Nuevo Balsas, on the Balsas River, in Cocula municipality, also in Guerrero State. This documentation shows a hole in the ground from which three nails, part of the fragmentation, are retrieved.



The intact DJI Matrice 300 RTK UAV recovered in Cocula municipality, Guerrero State

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A UAV that was taped back together by the locals



Documentation from the camera on the UAV of the release of an improvised bomblet

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The bomblet falling (top) and moment of impact (bottom)

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The UXO improvised bomblet documented alongside one of the downed UAVs

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Remains of metal nail fragmentation from an improvised bomblet that initiated

Assessment

Located between the Gulf of Mexico and the Pacific Ocean, with extensive borders with the United States and Central America, Mexico is a strategic location as an international port of entry for illegal substances, natural resources, weapons and people.

Mexico is home to the largest, most sophisticated and violent criminal organizations in the world, whose networks extend from Argentina to Canada, and Europe.

UAVs are used by Mexican cartels for three main functions:

- Armed attacks
- Transportation of chemical substances, including drugs
- Surveillance

According to the US Drug Enforcement Administration (DEA,) although historically, UAVs were used almost exclusively for surveillance along the border, on the Mexican side, they have begun to see a greater number of UAV incursions crossing the border, some on surveillance missions, but also increasingly for drug smuggling, mainly of hard narcotics, which do not require larger quantities for marketing. The DEA has stated this is a problem due to the fact they can be adapted in areas such as the speed with which they can cross the border, in addition to the fact they are inexpensive. Since 2012, the DEA has registered around 150 drug UAVs that crossed the border, which together carried approximately 2 tons of cocaine and other drugs, equivalent to an average of 13 kilograms per load.

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The Jalisco New Generation Cartel (CJNG) was a pioneer in the use of armed UAVs in Mexico. According to reports, the CJNG imported this aerial attack TTP from Colombia, specifically from former guerrillas of the former Revolutionary Armed Forces of Colombia (FARC,) who were hired to train members of the Mexican cartel in 2020. The CJNG in turn trained members of allied groups (at that time,) such as La Familia Michoacana (FM,) on how to carry out attacks, particularly in Michoacán and Guerrero. For the CJNG, arming and training the FM cartel members in armed UAV attack TTPs allowed them to secure control over territory that was disputed in the past and is essential for drug trafficking and extortion of local businesses, as long as the alliance remained intact. However, recent confrontations between the two cartels in Michoacán have demonstrated the fragility of these alliances.

Since then, additional CJNG connections with FARC dissidents have been exposed. In May 2018, the late former governor of Jalisco State, Jorge Aristóteles Sandoval, revealed the CJNG had hired the services of Colombian mercenaries to train its hitmen in ambush techniques, counter-ambushes, the preparation and use of IEDs and planting improvised mines.

The weaponized UAV attack TTP was first evidenced in the field in Colombia on September 18, 2019, in Tumaco, in Nariño Department, in the Pacific area, which is disputed by groups of former FARC members who sought control of the cocaine trafficking route (see <u>Möbius</u> report "Industrial Production of Munition Items by Colombian Armed Groups," ref. 49/2023) a year before the first recorded attack - an improvised loitering munition - in Mexico, in Tepalcatepec, Michoacán. (See Möbius report "Mexican Cartel Using Armed Drones," ref. 64/2020)

The transition to the widespread use of UAVs as tactical weapons for 'bombing,' or releasing IEDs or improvised bomblets from height, mainly by the Cárteles Unidos (English: United Cartels, CU,) and the CJNG started in mid-2021. (See <u>TGAlertS</u> TGA0643, "Mexican Cartels Using Armed Drones with Improvised Bomblets")

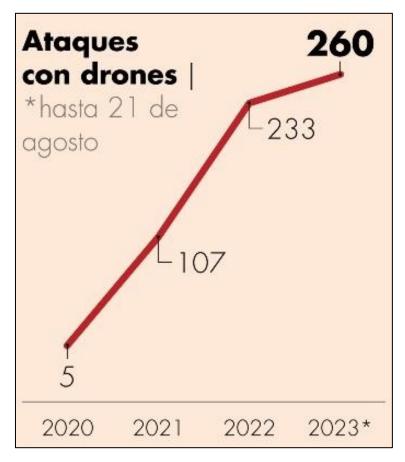
Between 2021 and 2022, the trend of using armed UAVs expanded, and documentation of attacks by armed UAVs with payloads of various configurations started to appear, in addition to the seizure of improvised bomblets of different styles by Mexican security forces. (See <u>Möbius</u> report "Armed UAVs used by Mexican Cartels," ref. 4/2023)

At a press conference on December 13, 2023, Luis Crescencio Sandoval, Mexican National Defense Secretary (Spanish: Secretaría de la Defensa Nacional, SEDENA) stated that from 2020 to date, 605 armed UAV attacks have been documented:

In 2020, there were five attacks; in 2021, there were 107; in 2022, there were 233; and in 2023, there were 260. The real number is probably higher, as residents of some regions of Michoacán and specifically Guerrero State claim armed UAV attacks occur on an almost daily basis.

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Armed UAV attacks, Mexico, 2020 – 2023

Armed UAV attacks have been reported in 12 states, although Michoacán, Guerrero and Tamaulipas are most prominent.



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In Guerrero State, where attacks occur on a near-daily basis, two men were killed in armed UAV attacks.

Many of the UAV attacks target civilian communities with the aim of intimidating or extorting the population, but sometimes the attacks are intended to force the population to vacate a specific area to facilitate the criminal activities of the Mexican cartels.

On April 28, 2023, residents of Nuevo Balsas, in Cocula, in Guerrero State, reported that that week, the FM cartel had intensified its armed UAV attacks against towns in the area. The community police force shot down one of the UAVs, whose camera was recovered intact, showing improvised bomblets being released and thermal tracking of targets.

On May 2, 2023, residents of the Nuevo Poblado El Caracol, in Guerrero, noticed UAVs flying overhead. One day later, they noticed the UAVs again, but this time, they released six improvised bomblets over the community.

On May 8, 2023, 11 more bomblets were released over the community.





Downed UAV and metal pipe-based improvised bomblets, Nuevo Balsas, Cocula, Guerrero State, April 28, 2023

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Armed UAV attacks targeting the town of Nuevo Poblado El Caracol, in Heliodoro Castillo municipality, in Guerrero State, began on May 2, 2023. The population of this town has dropped from over 600 to less than 200 since the attacks began.

The targeted municipality, in the North region border area, is disputed by the FM and Los Tlacos cartels. The FM controls a large part of Tierra Caliente, while the Tlacos have a presence in the Sierra, Central and the North.

Documentation of damage from dozens of FM cartel armed UAV attacks targeting Nuevo Poblado El Caracol was published during August 2023, as well as remains of improvised bomblets.



Impact from an armed UAV attack and remains of an improvised bomblet, Heliodoro Castillo, Guerrero, August 2023



Remains of improvised bomblets

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On September 3, 2023, the FM cartel carried out an attack against the same town, reportedly incorporating 33 improvised bomblets.



Remains of improvised bomblets, September 2023

Concurrently, armed UAVs are used in turf battles and skirmishes between the various cartels and armed groups in Mexico.

On August 7, 2023, there were reports regarding a shootout between members of the CJNG and Los Blancos de Troya - a gang that operates under Los Viagras (a rival of the CJNG) in the Los Hoyos and Puerta Dealambre communities, in Apatzingán, Michoacán State. Video documentation of an armed UAV attack by the leader of Los Blancos de Troya, Cesar Sepúlveda Arellano, aka *El Boto*, during the clashes, targeting (and missing) a CJNG vehicle was posted on social media. Reportedly, other improvised bomblets hit the homes of local residents.



An improvised bomblet is released from an armed UAV

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Impact and initiation (misses the target)

Since 2020, the CJNG has enhanced its improvised bomblets, making them larger (up to triple the size of the original bomblets,) more deadly, and has even filled some with pesticide to create a chemical bomblet, according to reports.

The first *IEDs* recovered in Tepalcatepec, in Michoacán State, in 2020, were galvanized pipes measuring approximately 10 cm in length, filled with black powder and metal fragmentation.

In October 2023, self-defense groups in Aquila, in Michoacán State, found an *improvised bomblet* they had not seen before. It was a metal pipe measuring approximately 35 cm in length, filled with black powder and fragmentation, weighing approximately 5 kg and whose effect, they claim, is 10 meters.

These bomblets, being so heavy, are released from agricultural UAVs used for fumigation purposes.

The members of the self-defense groups also recovered another improvised bomblet in Aquila that had not detonated. This bomblet was more compact, comprising "several pipe segments assembled together that form a kind of improvised mortar, which when dropped on its end explodes, because inside they have a shotgun shot activated with a detonator."

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IEDs measuring 10 cm in length, circa 2020



"New generation" IED (modified for use as an improvised bomblet) measuring 33 cm, 2023

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Two "new generation" improvised bomblets – allegedly chemical bomblet at the front



Closer look at the "new generation" allegedly chemical bomblet

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In order to transport these heavier payloads, there is an increasing use of larger UAVs designed with agricultural applications, such as the DJI Matrice 300 RTK and Matrice 350 RTK, which has a large carrying capacity of up to 2.7 kilograms (as opposed to small drones that only carry hundreds of grams.)



DJI Matrice 350 RTK

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The different types of improvised bomblets for UAVs known to be used in Mexico can be characterized as follows:

• Bomblets fashioned from simple metal pipe IEDs, some fitted with an improvised plastic tail and some with point-detonating fuzes.





Metal pipe IED body and a plastic tail fashioned from two pieces of curved plastic. An improvised PD fuze is taped to the bomblet before it is wrapped in plastic for storage and transportation. 74 improvised bomblets recovered from the CJNG in Las Pilas, Santa Maria del Oro, Jalisco, March 23, 2023

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The same model of bomblet documented in a CJNG cache seized in Cuitzeo, Poncitlán, Jalisco, December 12, 2023

Empleo de AA.EE.II. con drones





Classification of this type of improvised bomblet (source: official SEDENA documents from the Guacamaya Leaks)

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Improvised bomblet fashioned from a PVC pipe body, recovered in the vicinity of the Huarachita community, Buenavista, Michoacán, November 27, 2023



PVC pipe-based improvised bomblet found following a battle between the CJNG and CU cartels, El Cajón, Tepalcatepec, Michoacán, October 6, 2021

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• Bomblets based on fire extinguisher bodies, usually with a double PD fuze and plastic cupbased tail.

Specifications:

- o Length approximately 45 cm
- o Length of fire extinguisher warhead approximately 20 cm
- Weight approximately 1.5 kg (including fragmentation, in the form of razor blades, U-nails and metal nails)





Components of the improvised bomblet, comprising a fire extinguisher-based body, plastic cup tail and three different kinds of metal fragmentation – razor blades, metal nails and U-nails, attached externally, recovered in Apatzingán, Michoacán, June 18, 2023

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The specifications of the improvised bomblets

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The specifications of one of the improvised bomblets



The remains of what appears to be a fire extinguisher-based improvised bomblet with externally attached U-nail and metal nail fragmentation and a broken plastic cup tail found in Los Sandoval, Apatzingán, Michoacán, April 10, 2023

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Pre-fragmented metal pipe-based improvised bomblets with metal tails and burn fuse.





Pre-fragmented metal pipe-based improvised bomblets with metal tails, La Estancia, Marcos Castellanos, Michoacán, February 23, 2022

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Pre-fragmented metal pipe-based bomblets with a single percussion cap fuze.



Pre-fragmented metal pipe-based improvised bomblets, each with a single percussion cap fuze (source: official SEDENA documents from the Guacamaya Leaks)

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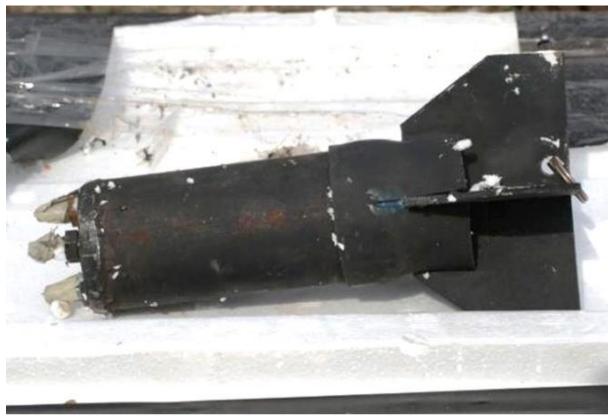
• Pre-fragmented metal pipe-based improvised bomblets with metal tails and percussion cap nipples.



Improvised bomblets, each with a single percussion cap nipple, seized following a clash between the CJNG and the CU, and local citizens in the vicinity of the municipal presidency, Nuevo San Juan Parangaricutiro, Michoacán, March 10, 2022

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Improvised bomblets in metal pipes with overlap metal tails and three percussion cap nipples, intercepted from a vehicle in the town of Las Coronillas, Tarímbaro, Michoacán, March 24, 2023

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Three improvised bomblets (two different models) in metal pipes, all with three percussion cap nipples, seized from Colombian members of the Los Viagras Nueva Italia group, dedicated to preparing improvised bomblets for armed UAVs for Los Viagras (part of the CU cartel) in Catalinas, Buenavista, Michoacán, October 8, 2023

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40 improvised bomblets with three percussion cap nipples seized from a CJNG IED/HME workshop in the El Tanque neighborhood of Teocaltiche, Jalisco, October 4, 2023

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Others.



Two improvised bomblets painted green, discovered among a weapons arsenal in a "safe house" following a chase after a criminal on Valle de Santiago Street, in the El Mirador neighborhood of Abasolo, Guanajuato, February 21, 2022



Improvised bomblet in a spherical-shaped casing with a band of metal balls wrapped around the center and two zip ties for attaching to a UAV, Apatzingán, Michoacán, August 8, 2023

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Six improvised bomblets in spherical metal casings, one with a tail, some pre-grooved for fragmentation and others with bands of metal ball fragmentation attached around the center, La Ruana, Michoacán, September 11, 2023. In the bottom image, parts of the PD initiation system can be discerned

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Most of the improvised bomblets contain pyrotechnic materials, such as black powder or gunpowder. The most common initiation systems, percussion caps, are sometimes elongated. There are also percussion cap nipple systems - simple, PD fuzes that incorporate, under the point of impact, a rifle percussion cap or material sensitive to impact and friction (such as flash powder,) which ignites the main pyrotechnic charge.



Four improvised CJNG bomblets seized in Los Sandoval, Apatzingán, Michoacán, April 19, 2023. All four have percussion cap nipples (one large,) one has pre-grooved fragmentation, one has externally-attached U-nail fragmentation, two are based on pipe IEDs, and there is different pyrotechnic material in small plastic bags

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Mechanical PD system with a shotgun percussion cap (source: official SEDENA documents from the Guacamaya Leaks)



Mechanical PD fuze for improvised bomblets (source: official SEDENA documents from the Guacamaya Leaks)

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In addition to all the abovementioned improvised bomblets, on October 3, 2023, a green plastic crate containing nine bottles was found on a road in the El Lindero community, in La Huacana, in Michoacán State, by an army patrol. Each bottle was wrapped in cardboard and was fitted with a long twisted wire hook and a plastic cup tail, indicating they were intended to be dropped from a UAV. They contained an unidentified liquid that may have been intended for arson attacks.



Improvised bomblets containing an unidentified liquid, La Huacana, Michoacán, October 3, 2023

Additional reports in Mexico describe "new generation" improvised bomblets allegedly containing "Furadan" – the commercial name for carbofuran (a pesticide) - released from armed UAVs. According to the local victims, there have been about 30 attacks during 2023 so far with improvised bomblets that allegedly incorporated poison or agricultural pesticide payloads. However, there has been no corroborating published documentation from the field of chemical dispersing improvised bomblets released from armed UAVs.

Notwithstanding, this same pesticide was reportedly used in chemical dispersing IEDs documented in December 2022. (See TGAlertS TGA0726, "CING Chemical Dispersing IED Array Neutralized, Coahuayana, Michoacán, Mexico")

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Carbofuran

Name: 7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, 7-(N-methylcarbamate)

Other names: Adifur, Chinufur, Curaterr, Diafuran, Furadan, Sunfuran, Terafuran

CAS no.: 1563-66-2

Mol. formula: C₁₂H₁₅NO₃

Melting point: 153-154 °C

Boiling point: 313 °C

Vapor pressure: 0.00000054 mmHg (25°C)

Carbofuran is an odorless white crystalline solid. It is an N-methyl carbamate insecticide. Like other carbamates, it inhibits the acetylcholinesterase neurotransmitter and can cause nerve and tissue failure.

Carbofuran is highly toxic by the oral route and by inhalation, and has low dermal toxicity. Fatalities from carbofuran ingestion have been reported. When heated to decomposition it emits toxic fumes of nitrogen oxides.

Carbofuran is moderately persistent in soil (half-life of 55–115.5 days). It is water-soluble (0.7 g/L at 25 °C) and has low adsorption coefficient [Koc = 30] that strongly favors its contamination in surface and ground waters. In plants, carbofuran is degraded to the conjugate of 3-hydroxy-carbofuran, which is present in the plant at least for 28 days after treatment. 3-Hydroxy-carbofuran is highly toxic (LD50 in rats: 7 mg/kg.)

Toxicity:

LD50 oral value in rats: 5-13 mg/kg

LC50 inhalation value in rats: 85 mg/m3

48-hour EC50 value in Crustacea (Ceriodaphnia dubia): 0.002mg/L

96-hour LC50 value in freshwater fish (Poecilia reticulata): 0.22 mg/L

ECHA classification:

Acute Toxicity 2. Fatal if swallowed.

Acute Toxicity 2. Fatal if inhaled.

Aquatic Acute 1. Very toxic to aquatic life.

Aquatic Chronic 1. Very toxic to aquatic life with long lasting effects.

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The allegedly chemical improvised bomblets are described as consisting of several pipe sections assembled together, initiated by a shotgun percussion cap and detonator.







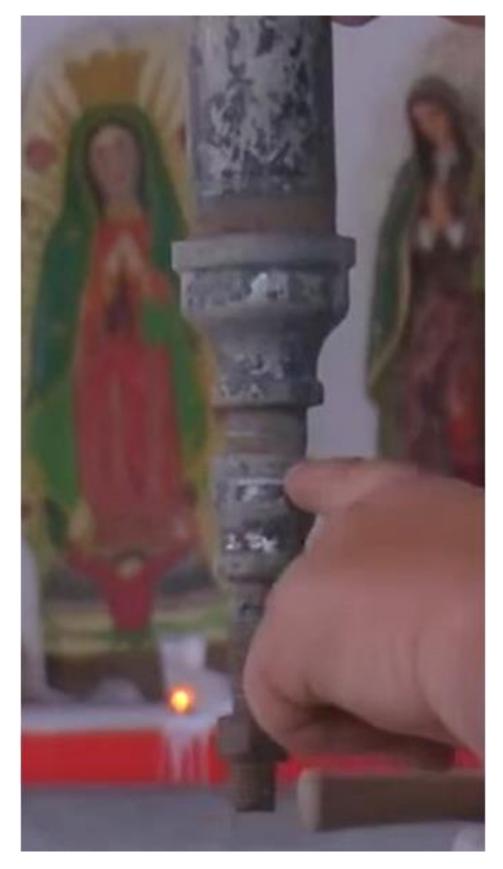


"New generation" allegedly improvised chemical bomblet

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"New generation" allegedly improvised chemical bomblet

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"New generation" allegedly improvised chemical bomblet

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Although as stated, no evidence has been published of the presence of improvised chemical dispersing bomblets in Mexico, in December 27, 2022, documentation of the discovery of a chemical dispersing IED array that included jars of pesticide, placed at intervals of ten meters on a narrow road on the banks of the Coahuayana River, on the border of the Mexican states of Colima and Michoacán was published. The IEDs were neutralized by Mexican EOD technicians. The two insecticides attached to the IEDs were identified as methomyl and carbofuran, both carbamates. (See <u>TGAlertS</u> TGA0726, "CJNG Chemical Dispersing IED Array Neutralized, Coahuayana, Michoacán, Mexico")





Chemical dispersing IEDs, Coahuayana, Michoacán, December 27, 2022

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In the October 10, 2023, video showing the "new generation" improvised bomblets, additional illustrative images of the chemical dispersing IEDs used in Coahuayana in December 2022, were published.



Illustrative image of the chemical dispersing IED configuration, October 10, 2023 (translation on the right)

The use of armed UAVs by the various cartels, especially the CJNG, in Mexico has increased steadily over the past three years, targeting rival cartels, the civilian population - in an attempt to control and take over areas, and police and military forces.

On December 11, 2023, a military force was reportedly attacked with at least two armed UAVs in the town of Charapendo, in Gabriel Zamora municipality, in Michoacán State. This was the first time the FM cartel attacked government forces with armed UAVs. This region, known as Tierra Caliente, is the scene of a dispute between the CJNG, the Knights Templar, the Zicuirán Cartel and the CU regarding control of drug trafficking, extortion, tax collection and other activities on the route that connects the states of Mexico with Colima and Jalisco through Michoacán. Following the attacks, SEDENA announced two anti-drone units equipped with high-tech anti-drone systems were already operational and six more would be stationed in Gabriel Zamora, in Michoacán State, and Heliodoro Castillo, in Guerrero State in the near future. According to SEDENA, the anti-drone system, identified as the ND-BD003 handheld anti-drone system made by the NovoQuad (NQ) Defense group, has radars that can detect the presence of UAVs at a distance of up to 1.5 kilometers. The system can also identify the type and model of drone. These systems have been used, with some success, but no documentation of such has been published at this stage.

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The 11.5% increase in armed UAV attacks in 2023 caused the federal government to seek to regulate their use with a reform of the Federal Penal Code and the Firearms and Explosives Law, regarding the regulation of remotely piloted aircraft. On October 3, 2023, the Justice Commission of the Chamber of Deputies endorsed an initiative by President Andrés Manuel López Obrador to punish the use of drones to create alarm, terror or attack national security, or to extort the authorities or individuals, with prison terms of 20 to 53 years.

The reform also provides for a prison term of 10 to 20 years for anyone who attacks the population's property with drones carrying explosive or chemical payloads that, alone or in combination, can be used as explosives. For attacks against armed forces, the sentence will be up to 30 years.

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