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MYANMAR'S TECHNOLOGICALLY ASYMMETRIC CIVIL WAR: CHINESE DRONES FLEET WITH UKRAINIAN CHARACTERISTICS

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Abstract

The major lesson of global drones' conflicts i.e. the commercialisation and miniaturisation of drones is most applicable in the ongoing Myanmar civil war. With Myanmar's military Tatmadaw and an array of nearly 17 non-state militant groups involved in the guerilla war since 2021 across the mountains and dense jungles, the drones' employment methodology in the Russia-Ukraine war has been copied to a great extent particularly combatisation of the commercial small civilian drones. While the fighter aircrafts, attack helicopters and Chinese UCAVs of the Myanmar's Air Force (MAF) have bombed the opposing ethnic groups and their occupied areas, many of the tactical battles in 2023 and 2024 have been won by the resistance groups adopting Ukrainian tactics on low-cost Chinese drones' fleet. The year 2025 saw Tatmadaw

regain many lost territories by converging the advantages of MAF's air superiority at higher altitudes with counter-drone jammers at lower altitudes to deny tactical air dominance to the drone units of the resistance groups. Thus, in the technological cat and mouse game for domination between drones and C-UAS platforms, the Resistance Groups in Myanmar adopted the fibre controlled First Person View (FPV) drones for evading military's jammers. The Myanmar civil war unexpectedly ranks at third position globally for having the most drone strikes amongst the ongoing conflicts. Myanmar is the shortest Chinese geo-political gateway into the Indian Ocean Region (IOR) and an important supporter in Association of South East Asian Nations (ASEAN). The Communist Party of China (CPC) has thus supported the ruling Military Junta government to have its permanent support. In some cases, the CPC has also supported the opposing militias too to secure Chinese assets, trade routes, installations, and ports. The increasing availability of DJI drones and components has ensured that China can test its low-cost drones, all paid by Myanmar's government and opposing groups, without any casualties. This monograph has hence explored the employment of drones by both sides in the ongoing civil war, Chinese assistance, and derived lessons for C-UAS grid for the Indian military. The new Rudra Brigades, Shaktibaan Battalions and Divy Astra batteries must incorporate these lessons.

Key Words

Drones, Counter-Unmanned Aerial System (C-UAS), Tatmadaw (Myanmar Military), People's Republic of China (PRC), People's Liberation Army (PLA).

Introduction

> *"Post-coup...the greater availability of drone technology (Chinese) allowed non-state groups to adapt commercial drones for reconnaissance and combat purposes, enabling new offensive operations. The supply, modification, and deployment of drones have contributed significantly to the ground advances made by resistance groups over the past four years, countering the military's (MAF) air superiority…The military (Tatmadaw), for its part, has long trailed in drone warfare, relying mainly on its aging and often imprecise warplanes. Dwindling resources and territorial losses forced the*

military to develop its own drone program, learning from its adversaries' flexibility and seeking the support of its allies. At the same time, it has sought to undermine the resistance's offensive capabilities by deploying advanced jamming technologies and disrupting drone supply chains."

-Su Mon, ACLED[1]

Myanmar, neighbouring the PRC's Yunnan province, has been reliant on Chinese military support since long with greater focus on fighter aircrafts and drones. While China is the world's largest small drones' producer with global monopoly over drone components, it's immediate neighbour Myanmar is involved in a four years plus civil war accounting for a conflict with globally third highest number of drone events.[2] As the Myanmar military junta's coup to overthrow the civilian government in February 2021 triggered a fresh civil war, the resistant groups fist undertook a drone strike in December 2021. The employment of drones in the ongoing Russia-Ukraine War with unprecedented intensity from October 2022 onwards triggered the Myanmar's resistance groups to significantly enhance the intensity of their drone strikes in 2023 and incorporate Ukrainian innovations while executing drones strikes. The Tatmadaw was thus forced to rethink its Air Superiority strategy. The drones' units of the conflicting sides in the Myanmar thereafter emulated most Russian-Ukrainian technical, tactical and doctrinal developments. The resistance groups efficiently integrated Ukrainian characteristics on their Chinese drones while fighting typical guerilla warfare.

Since December 2021, the Myanmar's drones-air campaigns can be divided into three distinct phases of technological and tactical developments in the methods of employment of drones. The first phase of drones' employment commenced with a drone strike in December 2021 and basically involved the low-scale employment of small rotorcraft drones which were only capable of dropping locally modified small bombs. The onset of Russia-Ukraine war in February 2022 and the drones' miniaturisation surge since October 2022 had a spiralling effect on the Myanmar drones' conflict in early 2023. The resistance groups graduated to the employment of large rotorcraft drones along with the small fixed-wing drones for dropping artillery shells and mortar bombs. The ongoing third phase commenced around January 2025.

With Tatmadaw's shift to smaller drones and induction of C-UAS platforms, the resistance groups incorporated the latest drones' technologies including the optical fibre cable (OFC) FPV drones to target Tatmadaw's helicopters.

This is not the first time that drones have been used in various conflicts in Myanmar. The Military Junta has employed drones on many earlier occasions in numerous battles like the Shan State's Taunghkam and the Kachin State's Bhamo. However, the difference this time is that the ongoing civil war has seen enhanced intensity of the small drones' campaigns with the desire of the resistance groups to imitate the Ukrainian drone units to overcome their deficiency of conventional air power. The changes in the method of employment of drones in the ongoing civil war in Northern Myanmar are remarkable and noteworthy. The realisation of the importance of drones within the Tatmadaw and finally its optimal employment has facilitated the military junta to attack areas captured by the various resistance groups like the stronghold of Laiza controlled by the Kachin Independence Army (KIA).

The emergence of these high-tech weapons has not only changed the form of the battlefield, but also had a profound impact on the strategy and tactics of war even in the Southern Myanmar. On the battlefields of Myanmar, the year 2025 has seen the offensive employment of drones becoming the new normal like the junta's drone units in its Pyin Oo Lwin garrison targeting the Ta'ang National Liberation Army (TNLA) in Taunghkam. As seen in the battle for Bhamo, all the warring sides are now using advanced drones for reconnaissance, surveillance and executing strike missions in support for combat troops. The most famous drone-aided offensive of the Brotherhood Alliance titled the operation 1027 in 2023, displayed the flexibility and concealment of drones in shuttling freely through the Tatmadaw's defence lines and effectively striking enemy targets. [3] While the military junta has procured both Chinese and Russian drones, Chinese drones have stolen the limelight because of the much larger numbers, comparatively easier accessibility and geographical proximity of Chinese drones components providers.

Opposing Forces

To understand the employment of any weapon platform in any war, its's first important to briefly orientate to the opposing sides and major areas of conflict.

Military Junta / Tatmadaw

The Myanmar's official military also called the Tatmadaw, overthrew the ruling government in February 2021 and thus is the most modernised and largest defence force. The Myanmar Air Force (MAF) is the custodian of fighter aircrafts, attack helicopters and HALE / MALE UCAVs[a] like CH-3. While the MAF started focussed modernisation since 2014-15 with steep rise in budget, they imported nearly 1 billion USD worth equipment from Russia and China mainly between the coup in 2021 and May 2023.[4] From 2010 to 2019, China provided 56% of Myanmar's arms as per SIPRI.[5]

Resistance Groups

As a result of the coup and the existing ethnic tensions otherwise within Myanmar, more than 17 armed organisations, comprising of hundreds of ethnic armed organisations, are fighting against the Tatmadaw, details of which are as under:

- **National Unity Government (NUG) – People Defence Force (PDF)**: As the winning candidates of Myanmar's leading party of National League of Democracy were arrested on 01 February 2021, the diaspora members formed the NUG in exile. Those inside Myanmar united together to form the PDF in Myanmar's North-central areas. With the aim of reinstating NUG led democratic government at the national level, NUG raised PDF with nearly 100,000 fighters on 05 May 2021 to defeat the well-equipped *Tatmadaw* using guerrilla warfare tactics. [6]

[a] Medium Altitude Long Endurance (MALE) / High Altitude Long Endurance (MALE) Unmanned Combat Aerial Vehicles (UCAVs)

- **The Brotherhood Alliance**: The faction was formed in June 2019 to unite the Arakan Army (mainly operative in the Rohingya area in Rakhine State), the Ta'ang National Liberation Army (TNLA) and the Myanmar National Democratic Alliance Army (MNDAA) to achieve their common nationalistic goals. Post the coup, the Brotherhood Alliance allied with the PDF against the Junta in 2023. They started their fight with a major offensive Operation 1027 against the Junta, by swarming drones into the battle in end 2023 and capturing large swaths of territory including the Lashio city in the northern Shan State in August 2024. One of the Tatmadaw soldier retreating from the battle said that "*bombs were dropping from the drones one batch after another like rain*."[7]

- **Kachin Independence Army (KIA)** was raised in 1961 and has been fighting the ruling Myanmar government since then. Chinese claim that the **United States has provided tens of millions of dollars in aid to KIA** to overthrow the ruling government. As per them, "*entire Kachin Army has 9 brigades, each brigade is divided into 3 battalions, each battalion has about 200 people, plus miscellaneous personnel, a total of more than 10,000 people*". [8]

- **United Wa State Army (UWSA)**, as per Ye Myo Hein, from the Southeast Asia Peace Institute, "*has a long-standing ceasefire with the junta but still maintains a force of between 30,000 and 35,000 personnel, equipped with modern weaponry mainly sourced from China.* ***The UWSA functions as a key instrument for China to maintain strategic leverage along the Myanmar-China border and exert influence over other ethnic armed groups***". [9]

The major battles in Myanmar's civil war have taken place in its Central and Northern divisions particularly the Mandalay, Sagaing and Magway Regions called the MSM Region and Myanmar's Dry Zone. As per Nick Hdson:

"*Mandalay, Sagaing, or Magway, three administrative divisions encompass Anyar, also referred to as the Dry Zone. It is the main homeland for the Burmese ethnic majority Bamar people. Two rivers, the Chindwin and Irrawaddy, act as main arteries for the transportation of goods in an area where road travel is unreliable. The Dry Zone is considered the area with the most intense ground fighting since February 2021. Before the 2021 coup, the MSM region was comprised of Bamar Buddhists, Christian Chins, and other historically disregarded minorities. Since the coup, 33.36% of MAF air and drone strikes have targeted civilians in the MSM regions*." [10]

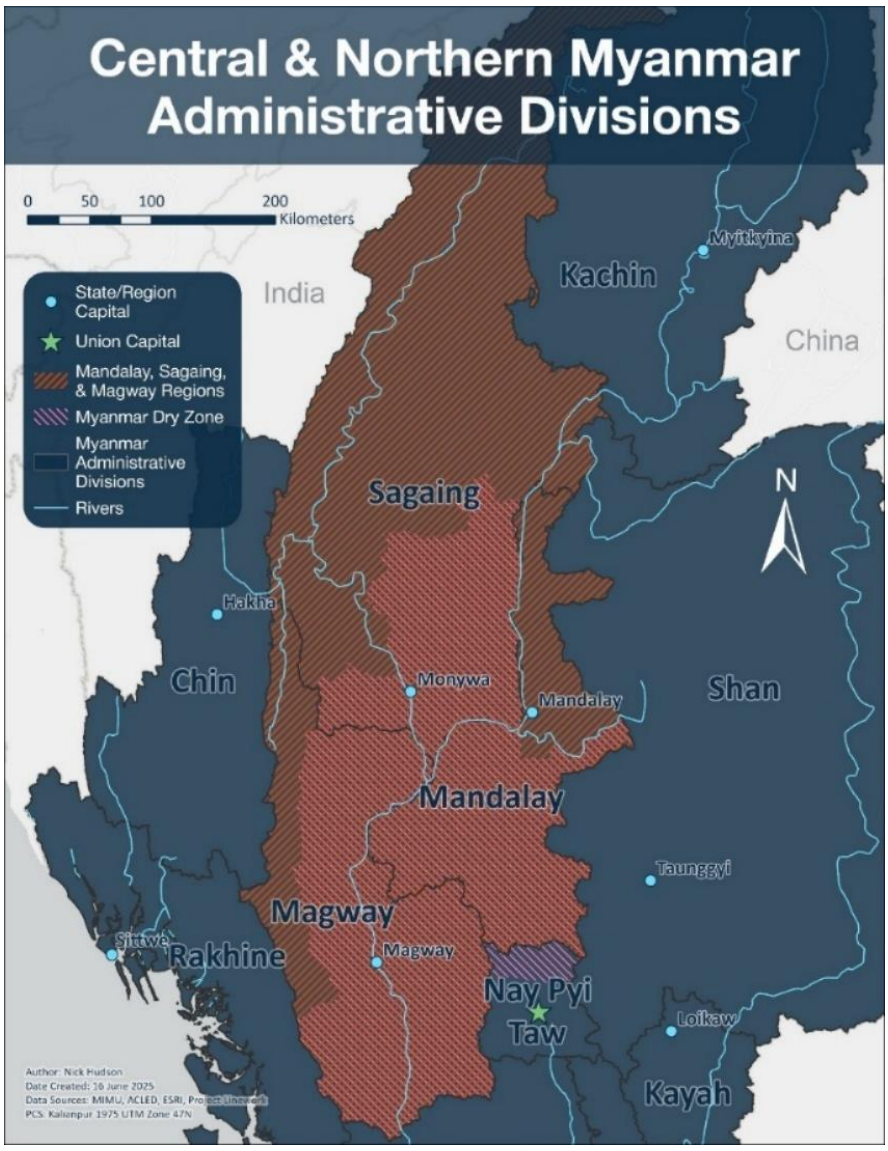


Fig 1: Map of Central and Northern Myanmar Administrative Divisions (Source-Tearline.mil[11])

Chinese Concerns / Interests

The PRC has significant geopolitical, economic, and military concerns in Myanmar and benefits from supporting the Miss Aung Hlaing's Military Junta government. [12] Despite the Chinese official stance of non-interference in another country's internal affairs, China has taken many actions to protect its own interests. The CPC's major concerns in Myanmar due to the ongoing civil war are: -

- The ruling government in Myanmar needs to be kept as a close partner for China's favourable political mediation in the ASEAN.[13]

- Prevent overthrow of Myanmar's military government by the KIA, considered a pro-American group from Chinese perspective, which could mean a pro-America regime on Chinese border.[14] PRC clearly wants to thwart such a scenario.

- Safety of trade ports along China-Myanmar border and trade routes along the special China Myanmar Economic Corridor (CMEC) and further for the Belt and Road Initiative (BRI). Thus, CPC wants to minimise the spillover of the war to China-Myanmar border. The capture of many strongholds of the Myanmar's Military by the resistance groups, nearly besieging Myitkyina, the capital of Kachin State, has allowed the opposing militias to control the Leiji Port on the China-Myanmar border.

- **Control of Myanmar's Rare Earth Mineral Resources**: Myanmar's rising debt from China are strengthening Chinese control over Myanmar's natural resources.[15] PRC imports rare earth minerals like dysprosium, terbium and oxide from Myanmar. Since the supply lines faced challenges after the takeover of major mining belt in the North Myanmar by one of the rebel groups in the ongoing civil war, the CPC has backed one of the rebel militias UWSA to protect the Chinese operated new rare earth mines in the hillsides of Shan state in Eastern

Myanmar. In fact, CPC has ensured that the mines itself are run by Chinese-speaking operators.[16]

- **Control of Chinese Assets**: Myanmar is gateway to PRC's oil trade routes to the IOR through the CMEC and then connecting Sri Lanka under the BRI. The gas volume of the China-Myanmar oil and gas pipeline, nearly 63,000 tons of crude oil daily, has most likely reduced by 15%, and the construction of Kyaukpyu Port has got delayed. [17]

- **Refugee Problem**: The 2015 Kokang conflict of Myanmar had triggered flow of nearly 60,000 refugees into PRC's Yunnan province.[18]

Types of Drones

Vertically launched take-off landing (VTOL) multi-rotor drones like quadcopters and hexacopters and horizontally launched fixed wing drones form the most used small drones by both sides in the civil war. The resistance groups have innovatively modified the agriculture and photography drones by adding FPV features, enhancing explosive and surveillance payloads and more importantly turning them into One Way Attack (OWA) / Kamikaze drones. [19] **However, the ease and difficulty of availability of drones, C-UAS platforms and its components for all conflicting sides has been generally controlled by PRC**.

Chinese Drones and Related Assistance to Myanmar

Chinese netizens have been discussing the employment of many Chinese and Russian drones in Myanmar's conflict especially in the Northern areas along the China-Myanmar border.[20] While CPC's concerns and interests have ensured that the PRC provided assistance to Military Junta primarily, it did provide significant assistance to other militias too like the UWSA. Although the Tatmadaw procured CH-3 UCAVs more than one decade back in 2013, Chinese drones were employed by the military junta in full intensity for strike roles only mid-2024 onwards.

- **CH3 /3A UCAVs – 2013**:Chinese have totally exported 24 CH-3 / 3A HALE / MALE UAVs to Myanmar since 2013 and presumably established a production line for CH-4 UAVs.[21] Myanmar acquired the first lot of 12 CH-3 UAVs between 2014 and 2015 to fight the armed groups along the border areas.[22] The Tatmadaw was trying to upgrade the CH-3 UAVs with FLIR payloads to undertake reconnaissance operations in low-light conditions.[23] The CH-3 UCAVs can carry and fire both missile and bombs- AR-1 air-to-ground missile and FT-9 guided bomb. [24] The production line may have become operational around 2014. [25] American think tank CSIS assessed deployment of CH-3A UAVs by Tatmadaw for Counter-Insurgency operations in 2015 and 2016. [26]

- **CH4 UCAVs**: MAF either procured 4 CH4 UCAVs from China or more likely have been produced in Myanmar's production base [27] transferred by the PRC. [28] They can carry 6 missiles / weapons each.[29]

- **DJI Drones**: DJI drones provided to Myanmar, at less than one-tenth of the similar products of the US military, are being employed by both sides to fight against each other.[30]

- **Export of Drones – 2023-2024**: ACLED report claims that "*In November 2023, the military junta leader visited Chinese drone manufacturers and reportedly ordered thousands of drone parts*".[31] China apropos exported drones and drones components to Myanmar military in end 2023 / 2024.[32] Out of these drones received, about 300 drones were sent to Rakhine State, about 400 drones were sent to the Tatmadaw's Northeast Military Command in Lashio responsible for Northern Shan State and balance were delivered to other states and regions. The drones lot delivered in end 2023 was possibly from a DJI factory in Shenzhen and was first provided for a unit located at Tachileik in Eastern Shan State. The main characteristics of these reconnaissance drones were a maximum take-off weight of 50 kg, endurance of 10 hours, cruising speed of 120 km/h, and a flight altitude of 4,000 metres.[33]

- **JF17's Maintenance Challenges**: The two major JF17 aircrafts' importing countries Nigeria and Myanmar have faced technical issues and maintenance challenges in the operation of JF17 aircrafts jointly produced by Pakistan and China. After **MAF grounded JF17 aircrafts as they found them unsuitable for operations due to technical malfunction and structural flaws**[34], **China is trying to intervene and ask Pakistan to provide newer versions of JF17**. [35] **This has further forced MAF to either increase Su-30 sorties or drone bomber sorties**.

- **Training and Raising of Drones Battalions**: Aung Thura highlights that "*Beijing has provided training in arms manufacturing to Myanmar military engineers and senior non-commissioned officers after they graduated from technical schools...Regime soldiers (Tatmadaw) began attending drone training courses in Tianjin in early 2024*" [36] Chinese most probably conducted initial training of drones' pilots at Tianjin in China and them Naypyidaw and Yangon under the "Train the Trainers" concept. The trained drone pilots were thereafter despatched to the various war zones to train fresh soldiers and raise various drone units. The focus was on the North East military region where even the militia were trained on drones.

- **Deterrence Exercise – April 2024**: The KIA's drone attack on Naypyidaw, Myanmar's capital, triggered an immediate mobilisation of PLAAF J10C and PLAGF elements ex PLA's Southern Theatre Command (STC) to conduct a Live-fire Deterrence Exercise along Myanmar-China border in April 2024. Many Chinese netizens have claimed that STC had conducted drones strikes on various locations with rumours of even three KIA battalions being wiped out. However, the Chinese official media has kept quiet on the issue. [37]

- **Control of Dual-use Exports**: During the visit of the Military Junta's Deputy Minister to China, CPC was requested to block the export of

drones' components and dual-use items to the various resistance groups in Myanmar. China responded by closing some of its land borders. Resultantly, the increased difficulty in procurement raised the cost of agricultural drones from 3000 USD in 2023 to nearly 6250 USD. [38]

- **Mandalay Earthquake – March 2025**: When a 7.7 magnitude earthquake hit Myanmar on 28 March 2025, [39] China provided drones support for rescue operations. The most advertised drone was the lighting drone which illuminated the affected power disrupted areas during the night for undertaking the rescue operations. [40]

- **Joint Anti-Terrorism Exercise "Thunder 2025":** As per Chinese claims, PLA and Tatmadaw jointly conducted a cross-border terrorism exercise "Thunder 2025" in April 2025. **Chinese netizens hint towards PLA's employment of a third generation "Cloud Shadow" stealth HALE UCAV to locate an underground arsenal amidst dense forests in Northern Shan**. The inputs suggest that the 17-members militant group may have had an EMP launcher. This would require more corroboration being a single post on Chinese net. [41] However, Tatmadaw is unlikely to have any presence in these areas and thus PLA most likely conducted drones strikes alone by itself without any participation of Tatmadaw. **The repeated talks and claims of Chinese drones' standoff strikes inside Myanmar indicate that PLA's STC has been conducting such strikes to protect PRC's interests**.

Russian Orlan-10 & Orion-2 Drones: MAF procured more than 20 Orlan-10 and Orion-2 surveillance drones from Russia in 2024. Russian military established a satellite imagery intelligence (IMINT) centre for Tatmadaw additionally.[42] With a speed varying from 10 to 150 kmph, endurance time of 10 hours, Orlan-10 has a maximum range of 600 km. [43] In a recent drones' exhibition most likely organised by a rebel militia, a look-alike model of Iranian Shahed / Russian Geran was also found with some Persian speaking persons present there.

Figure 2: Replicated Design Model of Russian Geran / Iranian Shahed in Drones' Exhibition of Most Likely Deang Army

Local Modified Drones: The most popular drone employed in the ongoing civil war is the modified agricultural drone. The resistant groups have regularly been found carrying one or two such drones. The Tatmadaw used two of these drones on the Dangkan battlefield in 2025. As the employment of drones has intensified in the internal civil war, few domestic factories have been established for modular components that are plug-and-play, with 6, 8, and 10-mounted drones available. [44]

Figure 2: Drone Mounts for Mounting Munitions

(Source- Chinese Website Toutiao [45])

Figure 3: Tatmadaw's Drone Detachments

(Source-Chinese Website Toutiao [46])

Based on the inputs from numerous Chinese online discussions and research from various other resources including the ACLED report by Su Mon, a summary of drones employed in the ongoing civil war is tabulated below: -

Type / Model	Capabilities / Description	Task / Purpose
China- CH-3 / 3A Fixed wing UCAV	Payload-100-180 kg, endurance-6-12-15 hours	Reconnaissance and Strike
China- CH4 Fixed wing UCAV	Licensed production; Payload – 345 kg, Endurance – 40 hours	Reconnaissance and Strike
China- DJI Mavic multi-rotor drones	Payload-100 grams, Endurance-50 minutes	Strike
China- FLH7 multi-rotor drone	Payload- 2 kg, Endurance 29 mins; night vision	Strike FPV
China- YZT-CZ55RC VTOL	Payload 30 kg	Surveillance
China- AheadX QP357 VTOL	Payload-10 kg, Endurance – 2 hours	Reconnaissance
China – XK-DR4C7	Payload-0.8 kg, Endurance 16-20 hours	Strike FPV
Russia- Orion 2 multi-rotor micro-tether drone	Payload- 2kg, height 100 m, Endurance 5 hours, jamming protection	Reconnaissance
Russia- Orlan 10E fixed wing drone	Payload- 6 kg, Endurance – 16 hours	Reconnaissance TI FPV
Russia- Albatross M5 fixed wing	Payload-1.5 kg, Endurance 4.5 hours	Surveillance
Russia – Vladlen Tatarsky-40 multi-rotor		Strike
Israel – Skylark-I fixed wing	Payload-1.2 kg, Endurance – 3 hours	Reconnaissance
Sky-02 multi-rotor	Licensed production	Surveillance
Improvised Delta Wing fixed-wing	Payload 2 kg, replication of Shahed 136 & Sunflower 200	Strike / Kamikaze

Table 1: List of Drones Employed in Myanmar Civil War

(Source- Author's Research & Su Mon, ACLED[47])

Known Drone Units

With a drones inventory majorly comprising small drones, there are not likely to be big drones' units within the conflicting parties. However, the known drone units on the various warring sides are discussed in this section.

Tatmadaw. The known drone units of Tatmadaw are listed below: -

- **Shante Airbase**: Located 4 km Northeast of Meiktia at 20.939435°, 95.913419°, Shante is the MAF's largest airbase and the HQ of the MAF's Central Sector Operations Centre.[48] Situated next to Tatmadaw's Central Command, CH-3 UCAVs have been found on the Northern apron of this base since the February 2021 coup. [49]

Figure 4: Shante Base with CH-3A UAVs in January-February 2021 post-Coup (Source- CSIS[50]**)**

- Tatmadaw raised a dedicated drone unit, directly under the Operations Department, in early 2024 after receiving drones' consignments from China including training at Tianjin. Brigadier-General Nay Myo Tun[b], most probably raised the new drone unit. Specially selected sergeants with adequate technical background have been posted to the unit. [51] This unit conducts combat reconnaissance and strike missions employing various drones of both variety commercial and military grade. This unit was appreciably operating in three conflict sites primarily as per the ACLED report- Bhamo (Kachin), Nawnghkio (northern Shan), and Kawkayeik (Kayin).[52]

[b] Brigadier-General Nay Myo Tun has most likely undergone a missile technology training course conducted by North Korean missile specialists in Pyin Oo Lwin.

- The 245 Light Infantry Battalion, based in Kengtung, Shan State under the Tatmadaw's Triangle Region Command, most probably operates the Chinese UAVs procured in 2024 and tested on 22 July 2024 in its sportsground. These drones were first tested and flown in Tianjin, near Beijing in China where the core group of trainers were trained.[53]

NUG – PDF: The PDF created a variety of drone units like the Federal Wings UAV Unit, also called the 1801 UAV Unit. On 07 July 2023, this unit announced the successful production of long-range combat and reconnaissance drones with the ambition of gaining capabilities to attack Naypyidaw.[54] Another PDF drone unit Falcon Wings operating in the Kayin state – claimed to have conducted 437 drones' attacks in 2022, killing about 200 Tatmadaw soldiers. One of the Falcon Wings drone units in Kayah's Loikaw township reportedly executed 125 drone strikes in 2022. The Kloud Team / Shar Htoo Waw is a unique drone knowledge hub responsible for training, dissemination of training material, innovation, and adaptation.[55] One more PDF's drone unit "Wings of the Irrawaddy" claimed to have conducted 80 drone attacks alone in 2022 killing about 80-100 junta troops. A PDF official of the Kayin state summarised the achievements of their drones' units as:[56]

> "*Drones have served as air support for our ground troops and are a huge threat to our enemy as well…they allow the PDF to completely dominate the air of the enemy camp*"

Figure 5: NUG's Federal Wings UAV Unit

(Source-Toutiao.com[57])

Karen National Liberation Army (KNLA)

Karen National Union's KNLA has Cloud Wings Drone Unit. [58]

Three Brotherhood Alliance

The drone detachments of the Three Brotherhood Alliance adopted drones in its basic tactics to map military junta territories, confirm the deployments, and then strike the outside check-posts and stakeout groups.[59]

Special Forces (SF) Detachments

Kokang Alliance Army established SF detachments equipped with drones and conducted special training for them. In addition to special tactical helmets, large-calibre sniper rifles and night vision systems, these detachments were equipped with low-cost drones. Each SF detachment comprising 5-6 soldiers was oriented for conducting full-scale drone warfare in a hunter-killer combination. While one soldier in each detachment was tasked for drone recce of adversary locations to perform the hunter tasks, the other 2-3 members are responsible for attacks using their own weapons and drones. One member is also responsible for operating UVs / robots for logistics sustainment. Each combat team is equipped with minimum 20 drones of various types, 20 AD and armour-piercing shells, 20 mines and other required ammunition.[60]

Figure 6: Kokang Army's SF Detachment with Drones and Civil Pickup Vehicle
(Source-NetEase.com[61])

Angry Bird Drone Rangers

A drone unit under one of the rebel forces, it started by employing Chinese drones for surveillance missions initially. It gradually assembled large drones for strike missions using local explosives and procuring general purpose drone components from regional e-platforms and by following social media videos.[62]

Major Drone Incidents

While MAF's aerial warfare and superiority was the most crucial to the conflict in retention of its grip on political power, the innovative employment of drones by the opposing forces changed the course of the war in 2024. With significant tactical victories by the resistance groups, the Tatmadaw has made heavier investments in drones, C-UAS and related technologies in the last one year. An ACLED report highlights the first drone strike in the ongoing civil war was in December 2021 in the Sagaing region in the Pale town. However, by 2024, drones had redefined the strategies of the opposing sides with more than 2100 drone strike incidents being reported from over 600 locations across Myanmar from December 2021 to May 2025. The report further brings out a case of **capture of Shadow town in Kayah state by the resistance groups just using drones without undertaking any firefight or suffering any casualties**.[63]

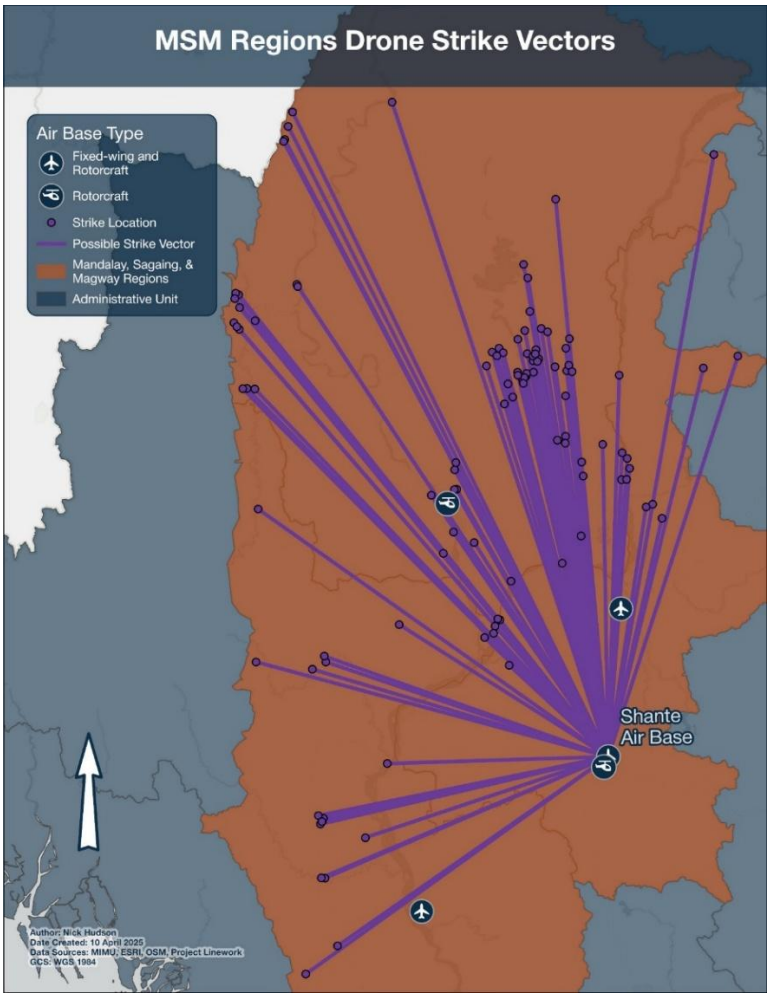
An Observer Research Foundation (ORF) report in June 2024 by Sreeparna Banerjee, highlights that the resistance groups undertook 100 flights per month on an average and generated 1400 online videos of drone flights from December 2021 to June 2023. The groups had even evolved from COTS DJI drones to improvised ones produced by using 3D printers.[64]

As per another report focusing on the MSM region, out of the total 1354 air strikes in the MSM region from 21 March 2021 to 21 March 2025, drones have accounted as the third most used vector by MAF after aircrafts (44%) and Mi-35P Hind-F Attack Helicopters (27%). MAF mainly employed the CH-3/3A from Shante airbase and CH-4 UCAVs till January 2025. They also then adopted the rebel groups drones' tactics of employing small drones for dropping mortar bombs.[65]

Aircraft Type	Total Strikes	Targeting Civilians	Color
Mi-17	26	1	
Mi-2	12	5	
Mi-35	166	33	
Rotorcraft Subtotal	203	39	
Yak-130	3	1	
A-5	2	2	
MiG-29	4	2	
K-8	2	0	
Jet	277	98	
Fixed-wing Subtotal	288	103	
Drone	133	69	
Subtotal Excluding Unspecified Aircraft	**625**	**211**	
Unspecified Aircraft	729	256	
Total	**1354**	**467**	

Figure 7: Airstrikes by Various MAF's March 2021 to March 2025

(Source-Nick Hudson, Tearline.mil[66])



Map 2: MAF's Employment of CH3 UCAVs for Strike from Shante Airbase

(Source-Nick Hudson, Tearline.mil[67])

In order to overcome the drone warfare advantages gained by the resistance groups, the Tatmadaw and its MAF resorted to the maximisation of its air superiority by manoeuvring high in the air. As compared to the first half strikes of 197 in 2023, and 640 in 2024, the MAF undertook 1134 airstrikes during the same period in 2025 from January to May. However, this air superiority has not been fully converted into victory as boots on ground also matter. The precise and continuous drone strikes by the resistance groups have caused greater territorial losses for the Tatmadaw further accentuated by the military junta's failure to station troops despite the latest conscription law in February 2024. Apropos, the Tatmadaw added much more drones and paramotors to its expensive aircrafts and helicopters fleet as visible in the strikes pattern in the graphs below.

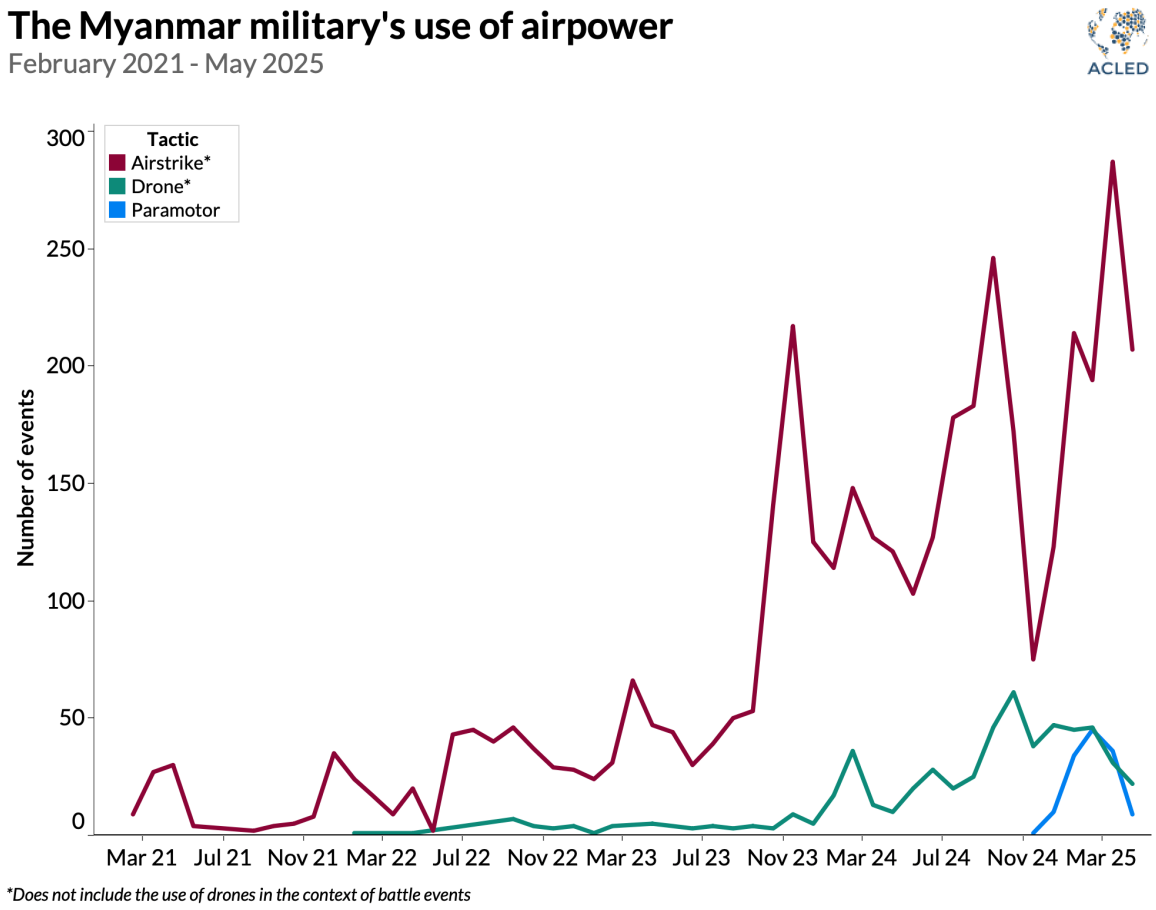
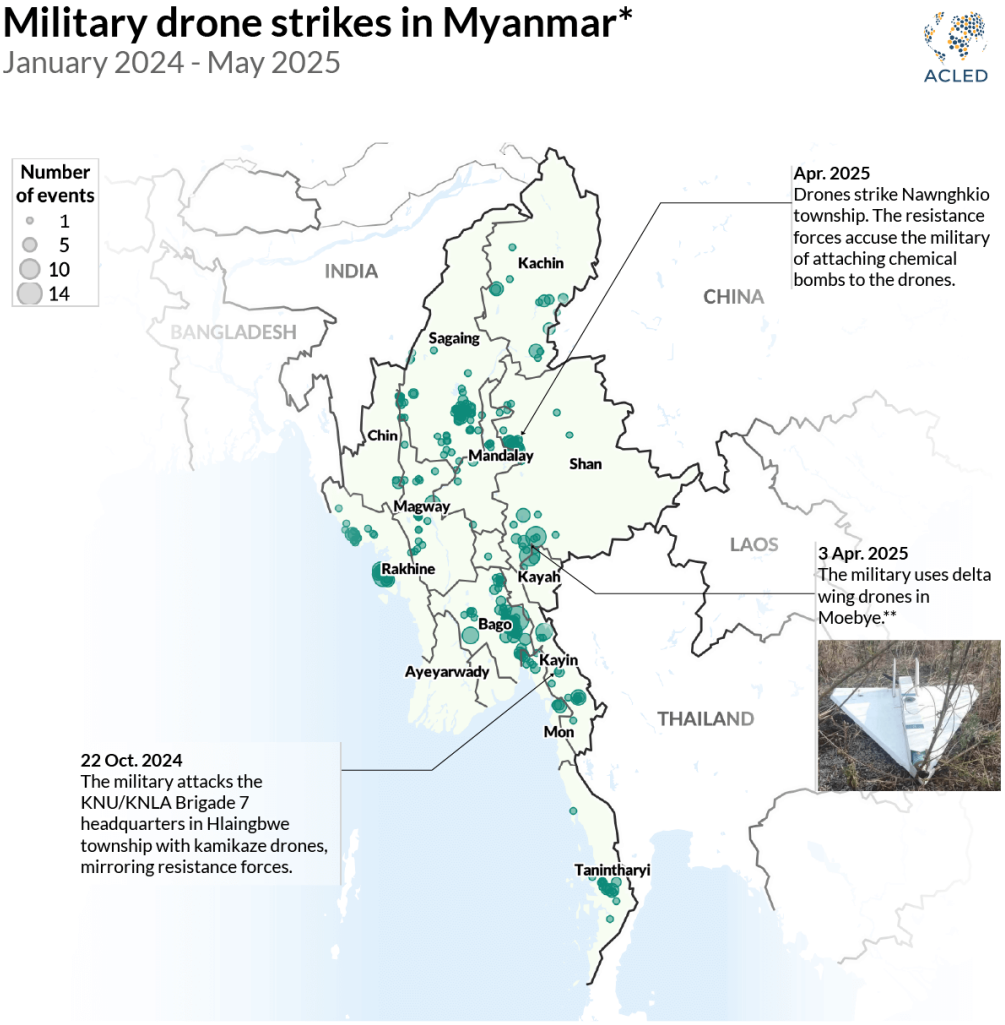


Figure 8: Tatmadaw's Pattern of Airstrikes – February 2021 to May 2025

(Source-Su Mon, ACLED[68])

Tatmadaw re-oriented its drones' doctrine, organisations and strikes methodologies duly incorporating the lessons learnt from the Russia-Ukraine war, strikes by their

adversary resistance groups and training from China. The enhanced frequency, sophistication and intensity of military junta's drones strikes from January 2024 onwards facilitated Tatmadaw to recapture tracts of territories like the "*Twin Nge village in Mogoke township of Mandalay region and Mae Poke and Naung Lin villages in Nawnghkio township of northern Shan state*" from the Ta'ang National Liberation Army (PSLF/TNLA) as reported by ACLED. Tatmadaw's new drone battalions operated under its AD umbrella but some distance away from their core bases. They improvised commercial drones for strikes using their own legacy munitions and even plastic body bombs. Su Mon writes that "*during an attack in the battle in Moebye in southern Shan state on 3 April 2025, it used a drone made from styrofoam and a type of plastic called corflute that resistance groups named a delta wing drone for its similar wing configuration to an Iran-made Shahed-136 one-way attack drone*". [69]



*Does not include the use of drones in the context of battle events
**Image source: Tachileik News Agency

Map 3: Tatmadaw's Drones' Strikes – January 2024 to May 2025

(Source-Su Mon, ACLED[70])

It's now important to study the major drone incidents sequentially to understand the evolution of the drone warfare in the Myanmar civil war. While the first drone strike was reported in December 2021 by a resistant group, the Tatmadaw used drones for surveillance of anti-coup protesters throughout the first year of war i.e. 2021.[71] On 27 March 2022, the Tatmadaw flew hundreds of drones in a public display during their 77th Armed Forces Day[72] to show off its Chinese drones' fleet to deter the resistant groups.

January to July 2023

On 06 July 2023, NUG's Federal Wings UAV unit conducted four drone bomb strikes to target Tatmadaw. From January to June 2023, it's appreciated that the Federal Wings UAV unit had conducted 281 drone flights, dropped nearly 680 bombs and killed approximately 50 soldiers of Myanmar military.[73]

Figure 9: Planning of Strike by NUG's Federal Wings UAV Unit
(Source-Toutiao.com[74])

October 2023

On 07 October 2023, Myanmar military security forces employed an anti-drone jammer to intercept a DJI Air-2S quadcopter of the resistance armed forces near Kaing Village, Pakokju Township, Pakokju County, Magway Region.[75] As per the Military Junta leader Min Aung Hlaing, the rebels had dropped more than 25,000 bombs on Tatmadaw's military posts, many of which had to be abandoned.[76]

November 2023

The "105th Mile Trade Zone" in Muse, Myanmar along the China border was stuck by the militia drones. A trade point with both exports from China and imports for China, the strike caused major destruction with majority of damaged equipment belonging to China. [77]

Figure 10: Explosion by Drone Strike on "105th Mile Trade Zone" in Muse, Myanmar along PRC-Myanmar Border in November 2023
(Source-NetEase.com[78])

December 2023

On 03 December 2023 in the Northern Shan state, the Kokang Army (MNDAA) conducted fixed wing drones strikes on a Military Junta's stronghold to ensure surrender of approximately 270 plus Tatmadaw's soldiers who raised white flags. The nearly 100 soldiers including 16 field commanders who refused to surrender and fled were traced by reconnaissance drones and killed by night vision combat drones.[79]

April 2024

The month of April 2024 witnessed many high-profile drone strikes. While Ukraine's major operation SPIDERWEB of striking Russia's airbases happened in June 2025, the resistance groups were striking MAF's airbases as early as April 2024 including the targeting of the largest MAF airbase at Shante later in November 2024.

- **04 April 2024:** PDF's Kloud Team / Shar Htoo Waw launched a drone strike, comprising 30 plus drones including more than 13 fixed wing drones, to simultaneously attack Aye Lar airbase and the Tatmadaw HQ in Naypyidaw. While the resistance groups and NUG claimed killing of two military soldiers and injury to four others,[80] the Myanmar government claims that the military Junta shot down all drones.[81]

- **08 April 2024**: The Southeastern Military Regional Command in Mawlamyine was attacked by five kamikaze drones during the visit of very senior Tatmadaw officer. [82]

- **09 April 2024**: A strike on military helicopter unit, by the resistance groups, destroyed two helicopters. [83]

May 2024 – Defence of Laogai Area

As soon as the Kokang Alliance Army came to know of the impending attack of Tatmadaw's 66th Mobile Division to regain control of Laogai area, it stepped up preparation of strong defensive measures including selection of drones' flight routes in mountainous areas for carrying out drone strikes for dropping missiles and bombs. As an 8,000 strong Tatmadaw force isolated Laogai area by establishing higher altitude positions, Kokang Army effectively carried out drones strikes in generally inaccessible areas to force military junta soldiers to flee and then employed drones to pursue the fleeing soldiers. Kokang Army even used its special trained SF detachments with drones. [84]

Figure 11: Preparation of a Hexacopter for Mortar Rounds' Bombing Strike (Source-NetEase[85])

October 2024

The headquarters of the 7th Brigade of the Karen National Liberation Army (KNLA) at its Debetha Camp in Myanmar, was stuck by a kamikaze drone on 22 October 2024 at 10 AM.[86]

November-December 2024

During the conflict between the militants and the Tatmadaw in November and December 2024, the Myanmar military had used both fighter jets and drones to attack

the militants while the militant faction also used drones including some Russian suicide drones. While Myanmar military's 4th Battalion of the Deyemiao County had seized few drones from prisoners captured on the battlefield, it had also found the wreckage of a Russian-made suicide drone in Mindaung Township, Magway Province in January 2025.[87] Some details include:

- Even the militants managed to seize one of Tatmadaw's eVTOL drone in the Xitang River Basin combat area in Bago Province on 22 December 2024.[88]

- On 04 December 2024, the KIA and allies launched numerous drones strikes to take over an airport and few other locations. However, with Tatmadaw's deployment of TI-enabled night vision advanced drones, the KIA found it challenging to progress ahead.[89]

- The fiercest of the drone attacks, dropping about 10 bombs, was on the few TNLA garrisons in Ongmadi village on 27 November 2025.[90]

- MAF's largest airbase Shante and the 99th Light Infantry Division were simultaneously targeted on 11 November 2024 by 24 drones of the resistance groups. The resistance groups planned this operation for nearly one year plus losing a few drones during the rehearsals. However, nothing is sweeter than success. The kamikaze drone strikes managed to destroy two Y-12 aircrafts of the MAF and two weapons factories.[91]

January 2025

In the first week of January 2025, two Shan ethnic armed groups SSPP and RCSS used drones to attack each other near Nanmo Village, Nauhe Township, Nansang Town over the issue of coal mine taxation. Nearly 200 households in nearby villages had to flee and take shelter elsewhere.[92]

March 2025 include: The month of March 2025 saw a rise in Tatmadaw's drones strikes.

- On 02 March 2025, Tatmadaw employed more than five drone teams on their civil pickup vehicles, as confirmed from video circulated, to launch drones' strikes of drop bombs via a stack of fixed wing and rotary wing drones to target TNLA / PDF soldiers in urban areas.[93]

- Additionally, the KIA claims to have destroyed Tatmadaw's seven sophisticated drones from 8 to 9 March 2025 in the Bhamo battle.[94]

- On 09 March 2025, another rebel group launched a drone strike after the opening ceremony for the new Kyaing (Gaojiali) Bridge. The local armed forces used two drones additionally to drop bombs on the old bridge on the Kyaing side at 6 AM on the same morning.[95]

- On 18 March 2025, Tatmadaw launched three suicide drones' strike to eliminate Karen National Liberation Army (KNLA) Chief General Su Je Ni in the Karen National Union (KNU) controlled area. However, the operation failed and zero casualties were reported.[96]

Mi17 Crash – May 2025

In the fifth month of Battle of Bhamo since 04 December 2024 between Tatmadaw and KIA, Tatmadaw claims it lost two Mi-17 helicopters due to a technical error. The inputs otherwise indicate that a drone unit of KIA stuck three Mi-17 helicopters of the Myanmar military on 20 May 2025 with OFC-FPV[c] drones in a Ukrainian copybook attack. KIA has been credited with shooting down Mi-35, and JF17 aircraft.[97] KIA's precise targeting of the main rotor bearing of the Mi-17 indicates that they have

[c] Optical Fibre Cable (OFC) guided First Person View (FPV) drones were first used by Russia against Ukraine to overcome Ukrainian advanced AI-enabled EW capabilities. While Ukrainians innovatively surprised the Russians through evolution of racing drones into FPV drones, Russians technologically surprised the Ukrainian military by the innovation of OFC-based FPV drones with Chinese assistance. **Chinese internet articles claimed that the particular drone model employed had 8 km long OFC spool and that "According to data from the Ukrainian battlefield, the penetration success rate of the OFC is 73% higher than that of the radio model".**

carefully studied the Russia-Ukraine war's strikes of helicopters in great detail and appropriately adopted the most cost-effective attack method. This incident thus has proved KIA's mastery over the latest drone technology and its clever integration into the guerrilla tactics.[98] During the same time from 06 to 10 May2025, Indian and Pakistan militaries fought another drones' war during operation SINDOOR but neither side had graduated to the employment of OFC FPV drones. This incident was distinctive of the third stage in the Myanmar's drones based civil war wherein the non-state armed groups started optimally exploiting advanced drone technology to challenge the ruling government's advantage in the air.

July 2025

The month of July 2025 witnessed a five days conflict between Cambodia and Thailand. However, Thailand was already tackling unintentional drones' intrusions from Myanmar including drones'-based theft incidents. Some details include:

- On 22 July 2025, Thai military discovered a crashed Tatmadaw drone loaded with explosives nearly 15 km away from Myanmar-Thailand border. This was supposedly fourth such incident in 2025 itself wherein Tatmadaw has targeted Karen National Liberation Army and the drone had most probably deviated. [99]

- During the capture of Tatmadaw's garrison in Nauqiu Town, the militants of one of the resistant groups captured 6 Orlan-10E drones intact from the Myanmar military.[100] If the reported incident is fully correct, then the Tatmadaw has already lost nearly 25% of its stock of Russian drones- 6 out of 20 plus drones procured. The Tatmadaw, on its part, has improvised the employment of large number of the latest Russian and Chinese drones including thermal ones to direct artillery strikes as also drop bombs on the militia locations in the Nauqiu area. [101]

Amidst the drones' battles, a very peculiar use of drones for theft of items was also found. Thailand police arrested four Myanmar citizens for drone-based burglary from

unlocked houses. This is another threat which local police officials need to be prepared for. [102]

C-UAS Platforms

In a usual cat and mouse game of technological and tactical advancements of drones and development of its counters, the Myanmar civil war has seen a much slower but a definitive development of its C-UAS platforms. The employment of C-UAS platforms by various stakeholders has been covered in the succeeding paragraphs

Tatmadaw

The Myanmar military was confirmed to have operated jammers during the March 2025 attack by the militants. [103] The range of Tatmadaw's portable jammers is generally restricted to 1 km.[104] However, they have advanced the technology by disrupting four frequencies simultaneously. The Tatmadaw increased the use of jammers wherever it could not match the number of drones sometimes even leading to accidents. On 22 November 2023, an explosive laden drone of one of the resistance groups in Muse crashed into the Zeyya Mingala Monastery due to jamming by the military. [105] **The effective use of jammers had two major repercussions- firstly the smaller resistance groups, mainly in the Sagaing region, reverted back to their specialisation in ground fighting having lost significant number of drones; second, the resistance groups like KIO / KIA[106] with better resources have upgraded to better technologies most importantly the OFC-FPV drones**.

Tatmadaw has also smartly upgraded its military tactics. **The most notable doctrinal evolution was that of combining its strengths of drones' jammers to block the militia drones at lower altitude while simultaneously exploiting its air superiority at higher altitude to conduct non-stop airstrikes by its fighter aircrafts**. This unique multi-domain tactics enabled Tatmadaw to defeat the resistance troops finally in the battle for Falam town in 2025 after losing at many locations in 2024. [107]

Allied Forces and Militants

The allied forces and militants opposing the Tatmadaw have also used counter-drone equipment like radars and lasers. The allied forces have mainly used civilian equipment which has been modified for C-UAS combat tasks and are also being used to interfere with Tatmadaw's Mi-17, Mi-35, and low-altitude bomber Yak-130 (procured from Russia). [108]

The rebel groups are keen to induct C-UAS platforms both passive and active variety. In a recent defence exhibition organized, C-UAS equipment displayed included handheld jammers of limited 1-1.5 km range and some medium range jammers of 5 km range. They also displayed a low-cost solution of anti-thermal imaging/anti-night vision combat uniform in a recent exhibition and which may be used by their special forces and snipers to raid Tatmadaw's drone detachments in the night. [109]

Figure 12: Display of Anti-Thermal Combat at Exhibition

(**Source**- Chinese Website Toutiao [110])

Figure 13: Display of Anti-Thermal Combat at Exhibition

(Source- Chinese Website Toutiao [111])

Major Lessons Learnt

While the world was busy in observing the Russo-Ukraine and Iran-Israel war, the evolution of drones in Myanmar's civil war has gone largely unnoticed with very few publications on it. Even on the Indian sub-continent, all scholars studied the Operation SINDOOR and its implications. However, PRC and PLA got to quietly test its advanced OFC FPV drones, FPV drones and even some of the advanced C-UAS platforms. Additionally, even PLA's STC's strikes largely went unnoticed. **There are a lot of relevant lessons for India- firstly Myanmar being our Eastern neighbour bordering some of the insurgency affected states; many of the insurgent groups sometimes hiding there; maximal employment of Chinese drones' fleet with Ukrainian style operations; and most importantly the use of drones by insurgent groups and militias many supported directly or indirectly by China**.

Technological and Tactical Evolutions

Unexpectedly, Myanmar's civil war has seen rapid prototyping of drones' tactical and technical evolutions in other global conflicts. The unconventional organisations and straight jacket procurement procedures of the resistant groups have allowed them to display appreciable tactical agility and organisational ingenuity to rapidly incorporate the lessons learnt. A summary of various upgradations in drones' employment is elucidated here.

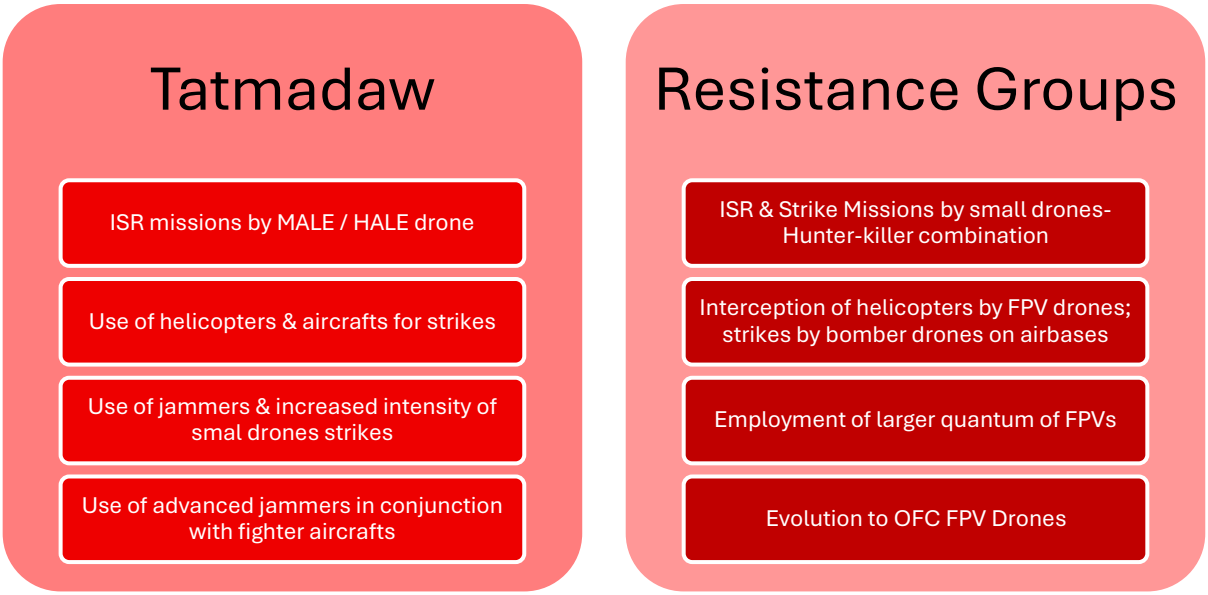


Figure 14: Tactical and Technical Evolution of Drones' Employment Concept
(**Source**-Author's Research)

Transformation to Unmanned Warfare

Like other conflicts, the Myanmar civil war has also witnessed the warring sides to gradually adopt to employment of unmanned vehicles (UVs) to minimise manpower casualties and replenish Tatmadaw's shrinking frontline battalions[112] by using drones and UVs to perform the dangerous, dull and difficult tasks. **Indian Army's gradual progression to Shaktibaan units and Divyastra batteries within Rudra Brigades is a very apt step. This has to be further backed up by induction of 100% non-Chinese UVs and robots to create Manned-Unmanned Teams and fully unmanned teams with matching doctrinal developments**.

Special Drones' Missions Planning

Like the Ukrainian planning of 18 months plus for the cellular FPV drones strikes on Russian strategic airbases under Operation SPIDER WEB on 01 June 2025, Israeli Defence Forces' one year plus planning for the pre-emptive FPV strikes on Iranian AD and missile launchers on 13 June 2025 under Operation RISING LION, the resistance groups have also planned many of their operations for a year plus to either strike strategic bases like Shante airbase in November 2024 or key localities held by the Tatmadaw. Similarly, PLA has been rehearsing its drones'-based operations of Taiwan's Presidential Place, Oil Rigs, American aircraft carriers and India's Pangong Tso lake etc. **For India, with Operation SINDOOR is still underway, as Pakistan's state sponsored terrorism is unlikely to stop with significant pro-Pakistan stance under Trump 2.0. On our Northern borders, there is no fall in Chinese rapid infrastructure development of military assets along the India-Tibet border with PLA's precise focus on development of medium and long-range strikes capabilities amongst all services. Thus, it's very important for Indian military to plan various contingencies in detail and rehearse the same in detail**. The biggest advantage of drones' rehearsals is minimum expenditure with maximal realistic environment.

Drones Fleet – Cheaper Option for Tactical Air Superiority

This four years plus long war has had two distinct phases- firstly the MAF's air domination with its aging, imprecise and some grounded aircrafts[d] and second and most recent Tatmadaw's transition over the last year to heavier reliance on lower-cost but more precise drones to counter the tactical victories gained by technologically asymmetric opposing forces inducting Chinese OFC FPV drones fleet with employment characterising the Russia-Ukraine war playbook. Unlike Israel with an advanced and modernised air force providing complete air dominance, low-cost small drones have turned out to be the cheaper and more viable option for developing countries having inadequately modernised air force.

[d] Mostly attributable to procurement of low-quality joint Pakistan-Chinese JF17 aircrafts.

Insurgents' Asymmetric Air Power

Small low-cost drones have facilitated PDF to achieve air superiority, without integral helicopters and aircrafts, in jungles and mountainous areas due to better technological adaptations on their sides. This has also been facilitated by many blunders on the part of the Myanmar's AF- inadequate training on C-UAS systems, reliance on obsolete helicopter fleet, grounded JF-17 aircrafts fleet. Thus, drones comprise the air combat arm of the armed groups without control of large runways and helicopters.

As IAF modernises its squadrons indigenously with some technological support from advanced nations, there is a need for all three services- Indian Army, Air Force and Navy to jointly work with our border manning paramilitary and adopt an air strategy to mitigate the drones' threat at lower altitude both trans-frontier by our adversaries and cis-frontier by the adversary sponsored terrorists. A doctrinal evaluation followed by organisational restructuring and suitable equipping is critical.

Tatmadaw's Reliance on Old Helicopter Fleet

The Mi-17 helicopters employed by Tatmadaw were designed in the Soviet era and lack advanced EW systems with no effective defence against low-altitude cheap small drones. The rotor system and fuel tank of the helicopters are also not equipped with composite armour protection. Chinese media highlights that in 2023, Russia had offered Tatmadaw an upgrade plan for installing the "Vitebsk" directional infrared countermeasure system. However, insufficient budget ensured that the Myanmar military government could not accept the proposal.[113] **Indian Army and IAF also need to have a relook at its strategy of employment of helicopters**.

Helicopter Based Supply Chain

As per Chinese media, the MAF continues to rely on the traditional "hub-and-spoke" supply model wherein the front-line bases are employed as hubs to deliver supplies to isolated strongholds by helicopter. This supply model seems outdated now after the KIA inducted Chinese portable AD missiles in 2024. Despite KIA's innovative adaption

of OFC FPV drones, the MAF has still not adjusted its strategy and relies on helicopters for air supplies. [114] **Indian Army and IAF also rely on helicopters'-based supply chain in many inaccessible areas and thus need to rely more on indigenised logistics drones.**

Security of Airbases and Heliports

Israel, Ukraine, and Myanmar's militias have all targeted the adversarial airbases with low-cost drones. The phrase "No Drone is too small to be ignored" thus often gets repeated. India has itself seen Jammu airport being struck by rogue drones. Thus, **IAF, Indian Navy and Indian Army Aviation in conjunction with Civil Aviation Ministry need to significantly strengthen C-UAS measures particularly against small drones**. The civil police must be incorporated in identifying drones' assembly areas nearby and DGCA for revision of relevant policies.

Dual-Purpose Drones

The local modification of aerial photography and agriculture drones into strike drones by the local resistance groups has democratised precision strikes to hit military junta's convoys, checkpoints, and camps. The Tatmadaw troops and the resistant groups have both been assembling drones by procuring some components like flight controllers from China's Boying (produced for agricultural purposes)[115] and such other sites, 3D printing other components and locally made explosives / other available munitions. **While India needs to deny adversary and terrorists this option on Indian soil, it has to be simultaneously be prepared to use the dual-purpose drones to indigenously manage the surge capacities required during war**.

3D Printing

With increased restrictions on procurement of Chinese drones, the resistance groups started improvising by using 3D printer machines like the Ukrainians in a similar situation. **Whether be it the Indian farmer or soldier on our borders, 3D printing needs to be optimally exploited to enhance the indigenous components of drones and for faster repairs**.

Drones Race

The battle for tactical air dominance triggered a drones' race. While it was the resistance groups which first conducted drone strike in December 2021 and peaked around the operation 1027 in October 2023, the Tatmadaw learnt its lessons a bit late. Despite being a late starter, the military junta has now covered up with the resistance groups. The rising cost of commercial drones and the enhanced use of C-UAS jammers by the Tatmadaw have also contributed to the fall in the numbers of drones strikes by the resistance groups. Thus, **the Indian paramilitary and the Indian Army in conjunction with the IAF need to optimise the C-UAS grid to minimise the drones' incursions by our adversaries both on the Western and Northern borders**.

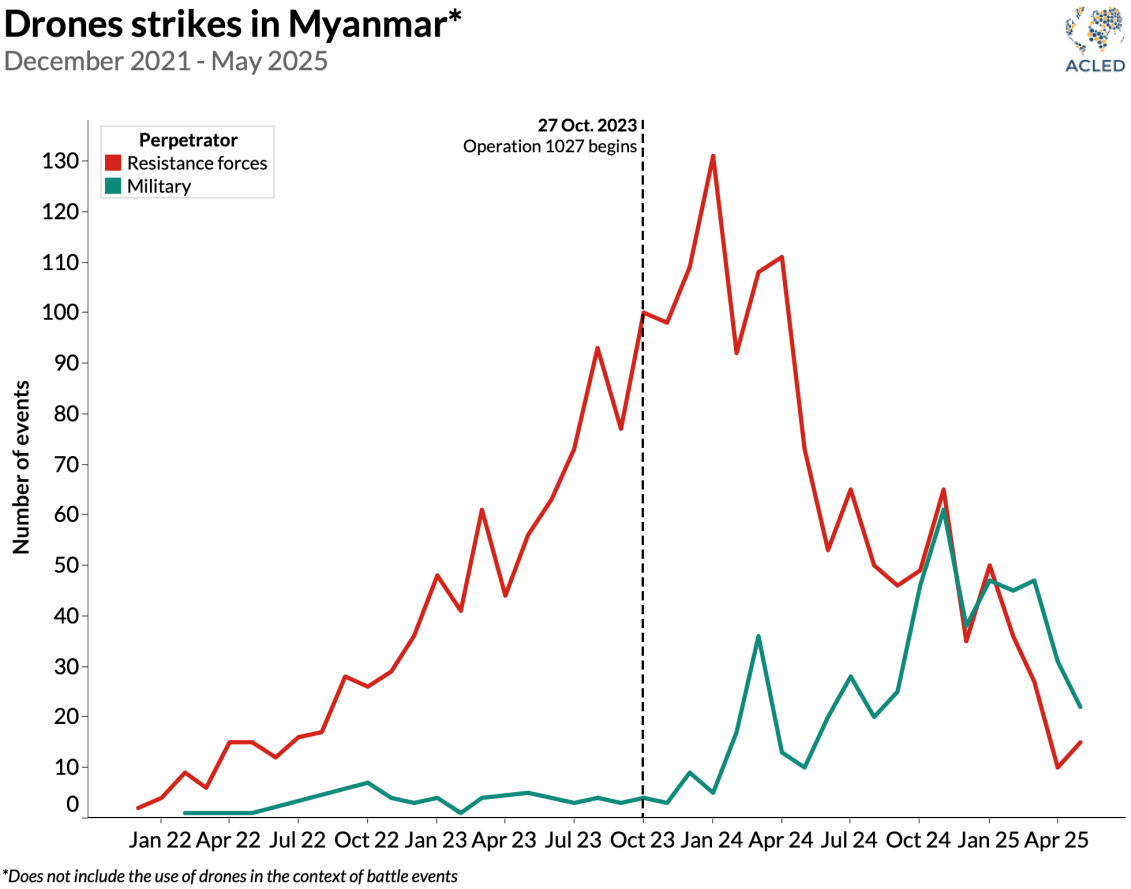


Figure 15: Drones' Strikes by Opposing Sides– December 2021 to May 2025

(**Source**-Su Mon, ACLED[116])

Constant Tactical and Psychological Pressure

Since 2024, the resistance groups have flown unarmed drones near Tatmadaw's bunkers and checkpoints, despite critical shortage of ammunition and explosives, with the sole purpose of harassment and maintaining constant psychological pressure on the military junta's soldiers. **Psychological conditioning of our soldiers to this new warfare is an absolute necessity**. Additionally, drills must be evolved for timely identification of decoys, surveillance and kamikaze drones and varying responses thereof.

Joint Planning and Multi-Domain Battle Space Management

The Tatmadaw's jamming of an explosive loaded drone resulted in damage to one of the prominent Monasteries and undesired civilian casualties. On the other hand, many of the resistance groups planned the employment of drones very well during their assault operations and sometimes capturing the objectives without any casualties. Thus, in a drones' infested environment, the following measures are strongly recommended: -

- **MDUV Planning Cell**: A Joint Multi-Domain Unmanned Vehicles (MDUV) Planning Cell at every brigade / sub-region level incorporating the BSF / ITPB / SSB / Coast Guard, Indian Defence Services – IAF, Navy and Indian Army, entities under Home Ministry- Assam Rifles (AR), Rastriya Rifles (RR), CRPF / State police agencies and local civil administration to deconflict the employment of UV operations, minimise fratricide through Identification Friend of Foe (IFF), handing / taking over of UVs threat in respective areas, and most importantly multi-domain battle-space management particularly electromagnetic spectrum allocation and allocation of air space.

- **Integrated C-UAS Grid**: C-UAS operations span all services and security agencies and most domains- air, EM, land, cyber, sea etc. Hence, there is a need to integrate and optimise the C-UAS architecture of all existing agencies and architectures involved like IAF's IACCS,

Indian Army's *Akashteer*, DRDO's developed IDDS, Indian Army's EW and ELINT organisations, drone squadrons of BSF being raised, cyber groups with all services, state agencies and civil setup etc. **Within the Indian Army, it will surely necessitate a suitable MDUV cum C-UAS cell ideally at Rudra Brigade level but minimum at division level to coordinate the EM spectrum and air space management with all variety of UVs being inducted.**

- **Kill Web – Sensor-Target-Weapon Matching**: While the Myanmar's resistance groups could conduct operations independently, the wide variety of drones' stakeholders in Indian defence and security establishment require coordination particularly with unique characteristics of wide variety of drones inducted- ISR drones, strike drones, kamikaze drones, FPV drones, loitering munitions, and then off-course cruise missiles and stand-off weapons from aerial vectors. With Space domain awaiting the implementation of SBS-III, a large number of HUMINT organisations, there surely is an urgent need to stabilise an Indian kill web from the national to sub-tactical level integrating the most suitable pervasive sensor for detecting the target and then most lethal and cost-effective weapon for engaging the target. **This will require many disparate systems amongst compartmentalised organisations to be integrated. With the brightest of IT talents for coding strongest algorithms available in India, there will be a way if the will exists**. The corollary is that any weapon, drone, modern aircraft or any C-UAS platform should not be purchased if it cannot be integrated.

Procurement Procedures

Like the case of Ukraine and USA, the Tatmadaw also modified its drones' procurement procedures to speed up the induction. Post the coup, the Army's Operations Department solely procures drones as against the earlier procurement agency- the Department of Defence Procurement (DOP) under the Ministry of Defence. [117] **As the clock ticks towards the end of 2025 – "the Year of Reforms",**

Indian defence forces need to undertake procurement and R&D reforms urgently.

Employment of SF Detachments with Drones

Like Ukraine and Israel, even the armed resistance groups in Myanmar have been quick in specialising their SF detachments in operation of drones for sabotage, raids and pursuit operations. While PLA is most likely reducing its SF troops overall, it's equipping and organising them better for unmanned operations. Indian Army is already optimising the employment of SF troops in its latest reforms. **Operation MAHADEV displayed the prowess of our SF troops and intelligence agencies in eliminating the terrorists responsible for the barbaric Pahalgam attack on 22 April 2025. Indian military needs to ensure that our SF troops are the most advanced troops in the field of drones' warfare and are aptly tuned for the complete canvas of drones' operations**.

Lack of Training

Although the Military Junta has been given adequate financial and technological assistance to induct drones and C-UAS systems, the ground troops have been found inadequately trained to operate both high-tech UAVs and counter-drone systems.[118] Even Pakistan had to rely on Turkish drones during Operation SINDOOR. **India needs to exponentially increase its planned workforce of one lakh drones' pilots to 10 lakhs plus and simultaneously launch a mission for training on C-UAS**.

Obsolete EW

Myanmar military's existing EW equipment is primarily aimed at mobile phone communications and fixed frequency EW. It does not have detection capability for frequency hopping and OFC FPV drones. [119] Indian military too had some limitations in EW neutralisation of swarms of Pakistani drones in Operation SINDOOR. This aspect needs close coordination amongst all stakeholders. **In fact, both Pakistan's smuggling operations across our Western borders and Myanmar's military's C-UAS operations against the resistance groups provide ideal opportunity and**

realistic testing environment for testing our indigenous innovations in C-UAS measures and platforms against Chinese drones' fleet.

Tatmadaw's Bomber Missions

Tatmadaw has gained expertise in low-cost drones'-based bombing missions. It has graduated slowly from employment of more aircrafts to more low-cost drones to conduct carpet bombing of areas wherever any resistance force soldier is found moving. **The employment of the small bomber drones by our AR, RR and CRPF in counter insurgency and anti-Naxal operations need precise execution with zero collateral damage. This should become a part and parcel of our training curriculum**.

Drones' Tactical Evolution

The **KIA drone teams, like Chinese PLA**, **have evolved a "swarm bait tactic": first use a swarm of cheap commercial drones to attract AD radars, induce the adversarial EW systems to emit, and finally send OFC FPV drones to carry out precise kamikaze strikes**. This tactic was validated as early in the Battle of Guigai in November 2024. Thus, it's a major drones' tactical evolution for an ethnic armed force which was majorly active in Northern Myanmar and mainly relied on guerilla warfare with light weapons and ambush tactics. They have evolved rapidly in less than two years with the absorption of low-cost latest drones' technologies and incorporated the lessons and the experiences from the ongoing international conflicts by introducing a lethal but low-cost combination of OFC and RF FPV drones, homemade mortars, and even anti-tank missiles. They have even evolved doctrinally to combine drone ambush and ground siege tactics to transform from two to three-dimensional combat capability.[120] More importantly, the generation of pilot skillsets within KIA is noteworthy and praiseworthy. **The flying of FPV drones itself requires specialised skillsets and then flying OFC FPV drones requires master expertise to overcome obstacles, and navigate in dense forests or mountainous terrain. Additionally, our EW and AD operators need to be realistically validated in not giving away their locations when our adversaries apply such tactics**.

Similarly, the military junta has evolved the hunter-killer combination of recce-bomber drones to conduct drone strikes though drop bombs. In copybook Ukrainian style attacks through tactical kill chains albeit with less accuracy due of shortage of training, the Tatmadaw drones' detachments have vigorously used fixed wing recce drones to detect enemy soldiers / militants and then target them through drop bombs from rotary wing drones. **All infantry sections / platoons and tank crews / troops need to apply this hunter-killer tactics in all types of drones assisted operations- assault, defence, raids, ambushes etc.**

Drones' Technical Evolution

KIA commenced major induction of drones in 2023 and rapidly progressed through: incorporation of a Ukrainian volunteer technical team to obtain FPV drones' assembly blueprints; purchase of DJI Matrice 300RTK drones through the Thai black market and thereafter modifying the OFC modules based on Ukrainian lessons; establishment of an underground parts supply network from Yunnan province along PRC's border. [121] Similarly, the Tatmadaw troops have also procured better quality drones gradually including C-UAS platforms and succeeded in intercepting drones.

OFC FPV Drones

KIA's employment of OFC FPV drones has negated the GPS and RF jammers procured by Tatmadaw. Even the most advanced EW measures by the most technologically advanced countries have failed against OFC-FPV drones as being daily witnessed in the ongoing Russia-Ukraine War. Chinese media article at Sohu.com highlights

> "*The destruction of Myanmar's Mi-17 helicopter by a fibre-optic drone is not only a testimony to the generational change of military technology, but also a harbinger of profound changes in war ethics. When today's high school students can assemble weapons to shoot down military helicopters simply through online tutorials, Clausewitz's classic saying "war is the continuation of politics" is being replaced by "war is the continuation of technology"…A simulation by Raytheon*

Company of the United States shows that the cost of intercepting FPV drones by existing air defence system is as high as $40,000 per shot, while Israel's "Iron Beam" laser weapon has not yet solved the problem of heat dissipation during continuous combat." [122]

Militant groups across the world have appropriately been fast in adopting OFC-FPV drones in their operations. While its OFC FPV drones this time, it could be robots next. **Hence, the technical and tactical evolution cycle must be coherently synchronised within the Indian Military**.

Evolution of Other Militaries

According to the NUG, the KIA has further transferred drone technology to the Arakan Army (AA) and the NUG's PDF. The cross-ethnic diffusion of this technology and adoption of a similar technologically advanced drones tactics model, by Maynamar's other resistance militant groups, can severely disrupt the logistics system of the Myanmar military government. [123] It will further degrade Tatmadaw's balance air transport capabilities.

Thus, the ruling military junta is extremely short of battlespace solutions. While the procurement of advanced C-UAS equipment from China or Russia will invite addition of more sanctions to their existing long list of sanctions and without advanced AD systems, they cannot cut off the rebels' supply chain.

Easy Accessibility

Despite absence of local dealers, DJI drones are easily available to the resistance forces and militant groups.[124] The core technologies of OFC FPV drones - inertial navigation modules and micro photoelectric converters - can easily be procured from Taobao. [125] Thus, the ease of accessibility for non-state actors to cutting-edge military technology has increased significantly.

Technological Asymmetry

The global miniaturisation and commercialisation of defence technologies has ensured that through mastery of latest technology, any non-state actor can gain asymmetrical advantages on the local battlespace. Traditional conventional militaries which are neither ready to incorporate nor doctrinally evolve will be weakened and challenged against technologically assisted state/non-state actors. KIA's effective employment of nearly 500 USD OFC-FPV drone to easily put down Tatmadaw's nearly 6 million USD worth Mi-17 helicopters is a prime example.

"Detection Equals Destruction" + Mounting Civil Casualties and Destruction

As the low-cost drone warfare intensifies, so is the collateral damage. Wherever any soldier of the opposing side is moving, a killer-hunter drone team manages to detect him and launches either a FPV kamikaze strike or drops bombs from drones. Whether the soldier passing through a civilian house gets killed or not, the house gets destroyed and so many villages / townships are being ruined in this manner. **While our soldiers need to practise zero collateral damage, our civilians along border and insurgency infested areas need to be trained in basic counter-drone survivability skills**. Every village surely has sharp shooters particularly in our North Eastern states. **Arming the sharp shooters and veterans of our vibrant border villages with C-UAS shotguns maybe a positive step in this direction**.

Chinese Low-cost Test Bed

Keeping PRC's core interests protected in Myanmar; CPC has been assisting both sides with drones directly or indirectly and have even conducted drones strikes along the border on the name of joint operational strikes with Tatmadaw. Its well know that Tatmadaw has no presence in those areas. Hence, PLA's STC has been conducting many of these drones' strikes, claimed as joint operations, on its own to protect its vital interests along the border and in Myanmar. While Russia-Ukraine war has been a test bed for most global drones and C-UAS firms, Myanmar's civil war has become a test bed for its MALE/ HALE drones strikes, low-cost DJI drones including OFC FPV and bomber drones' variety. **Unfortunately, in a civil-war ravaged neighbouring**

country, a great power China, CPC and PLA are maximising their drones' sales, new technology trials of similar terrain and tactical experiences.

Disaster Relief Operations

However, PLA must be analysed for excellent employment of drones for disaster relief operations during Myanmar's Mandalay earthquake in April 2025. Having deployed illumination drones by WTC during the Tingri Earthquake in Tibet in January 2025, PLA's STC incorporated the lessons learnt and facilitated 24x7 disaster relief operations in Mandalay in April 2025. **Our NDMA and NSG teams also need to work out on their relevant drones and C-UAS detachments.**

Deterrence

Through successful drone strikes, CPC and PLA have managed to deter all conflicting sides in Myanmar not to venture into striking any Chinese assets / installations / trade interests located inside Myanmar whether intentionally or unintentionally. After the border port strikes in November 2023, which caused maximum destruction to Chinese trade vehicles, no such incident has been repeated. **Thus, Chinese drones' strikes surely have had a deterrence effect**.

Chinese Appreciation - Evolution of Drone Warfare

A Chinese article on the employment of drones in Myanmar's civil warfare assesses the further evolution of drone warfare to be hierarchical:

> "The first echelon is the OFC FPV drones that specialize in attacking high-value targets; the second echelon is AI-enabled cruise missiles which suppress infantry / combined arms units; the third echelon is camouflaged bionic drones that perform infiltration and reconnaissance missions. The United States Department of Defence has assessed that traditional rear facilities such as field hospitals and fuel depots must be underground within five years, otherwise they will become the primary target of drone swarms." [126]

Conclusion

Small drones' development is one domain wherein the Chinese have taken a singular lead with Russians trying their best to catch-up. While the US military has led the development of large drones of HALE and MALE variety, it has now woken up to the reality of the significance of small drones and is thus trying its best to develop technology, doctrine, tactics, and components by itself. However, like the conflicting sides in Myanmar's civil war, the US military too is greatly dependent on Chinese drones' components. Indian military's sharp focus on small drones' development is quite clear on employment of small drones in the tactical battle area as visible from the official x-posts of various Corps and Commands. However, most posts invite immediate observations of most drone startups or specialists which highlight either the presence of Chinese drone, its component or copying of a Chinese C-UAS platform. **While the CPC and PRC's political elite and military scholars consider Myanmar as a vassal state, India can neither subdue itself to China nor afford to have a Chinese drone fleet. The presence of Chinese drones' fleets in Myanmar, Pakistan and Bangladesh and Tibet / Xinjiang itself is a multi-front drones' challenge**.

The manifestation of Chinese drones fleet in Myanmar with Ukrainian characteristics is a wakeup call for India – firstly one more neighbour of our insurgency affected states having both Chinese drones and C-UAS platforms being used intensively in battle for the last two years; secondly, the continued reliance of our start-ups on Chinese components with serious indigenisation still lacking; thirdly, the increased possibility of a drones' strike by any of the state sponsored incidents; and most importantly the continuing absence of adequate integration amongst all our services and paramilitary in employment of drones, their planning and the C-UAS architecture. While tanks were the main platform in the second world war, large drones of the American domination in Iraq and Afghanistan wars, small drones have dominated the battlefields of Africa, Syria, Iran-Israel, Russia-Ukraine, Myanmar and off course India-Pakistan. The future may just belong to swarm drones, robots and UVs, quantum, or any new technological evolution. Thus, **India must accept indigenous technology as our core combat capability, harness Indian talent within and outside India as a strategic resource and encourage organisational innovation, agility, and ingenuity as an essential**.

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Brigadier Anshuman Narang, Retired, is an alumnus of the prestigious Rastriya Indian Military College. He holds the “Adani Defence Chair of Excellence" on UAS Warfare with Special Focus on Counter-UAS at CENJOWS, is the Founder and Director of an independent Think-Tank "Atma Nirbhar Soch" and Advisor at Suhora Technologies. A keen China watcher, OSINT expert, reputed speaker and author of three books and numerous other publications, his PhD topic is "Chinese RMA and Centennial Goals - Implications for India". His fourth book "PLA's ORBAT Compendium" is under publishing while he is working on his fifth book “Drones in Recent Conflicts: C-UAS Implications for India”. As a gunner officer, he has the unique distinction of having been Brigade GSO-1 and Colonel GS of key armoured formations and has served across the complete India’s Western front from Siachen to South in both offensive and defensive formations. He raised a new Surveillance and Target Acquisition Regiment along Western borders on promotion to Colonel rank. He has attended courses in all quad countries- American Artillery's Captain Career Course, Australian Joint Warfare Course and Japanese National Institute of Defence Studies Course. He took voluntarily retirement after commanding a prestigious Composite Artillery Brigade in October 2024 along India’s Northern Borders to pursue in-depth research of India’s adversaries, military technological advancements, and conflicts world over. He pioneered the introduction of sUAS and FPV drones in Indian Army during his various appointments in Indian Army.

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