

RESEARCH NOTE

Still Aiming at the Harder Targets: An Update on Violent Non-State Actors' Use of Armed UAVs

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Abstract: Unmanned aerial vehicles (UAVs), often referred to as drones, are integrated into the repertoire of both state and violent non-state actors (VNSAs). This Research Note updates the findings presented in a 2020 article published in Perspectives on Terrorism, and presents descriptive statistics on violent non-state actors' use of armed UAVs. This research has, through open sources, identified 1,122 incidents where VNSAs have used armed UAVs in attacks. The UAV attacks are recorded across the globe, from Mexico and Ecuador, through the Middle East and North Africa, to Myanmar. However, 91.3 percent of the attacks occurred in the Middle East and North Africa. The majority of UAV attacks are directed at hard targets, such as military targets. However, the Houthis in Yemen stand out as a VNSA more willing to attack civilian infrastructure, such as airports, energy infrastructure, and the commercial shipping industry, using UAVs as a strategic weapon. The showcasing of UAVs' potential in combat and conflict by state and non-state actors through media and social media is likely to influence actors who have yet to incorporate UAVs into their repertoire.

Keywords: UAV, drone, non-state actors, fourth-generation warfare, Islamic State, Houthi

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Introduction

Unmanned aerial vehicles (UAVs) are an integrated part of the modern military, and the ongoing war in Ukraine has shown how small UAVs are hard for air defences to intercept.¹ The earliest recording of a violent non-state actor (VNSA) using armed UAVs in an attack date back to 2006. At that time, Hezbollah launched three armed UAVs—allegedly carrying 40 to 50 kilograms of explosives—against Israel from southern Lebanon. All three UAVs were intercepted by Israeli F-16 fighter jets.² While it took eight years until the next recorded attack, when Hezbollah attacked the al-Nusra Front in 2014, VNSAs have now been using armed UAVs for nearly two decades.³ Since the 2006 Hezbollah attack, UAVs have been integrated into the repertoire of ISIS, Hamas, Hayat Tahrir al-Sham (HTS), various Iran-affiliated militias in Iraq and Syria, drug cartels in Mexico, and most notably the Houthis in Yemen, to name a few.⁴ At the onset of 2024, UAVs are extensively used in several interconnected conflicts in the Middle East, between Israel, Hamas and Hezbollah, between the Houthis and an international coalition operating in the Red Sea, as well as between Russia and Ukraine.⁵ And in January 2024, a UAV attack against a remote US military base in Jordan killed three US soldiers and injured more than 40 others; an Iranian-backed militia based in Iraq subsequently claimed responsibility for the attack.⁶

UAVs' potential in combat has been showcased by both nation-states and VNSAs. Notably, the war between Ukraine and Russia (following Russia's invasion of Ukraine) has shown how small UAVs are capable of supporting combatants with intelligence, surveillance, target acquisition, and reconnaissance.⁷ It has also demonstrated the value of small commercial off-the-shelf UAVs and first-person view (FPV) UAVs in dropping grenades onto enemy combatants or merely flying directly into them to set off the destructive payload.⁸

This research note builds on the 2020 article published in *Perspectives on Terrorism* by Haugstvedt and Jacobsen, which explored the characteristics of non-state actors' use of weaponised UAVs in their operations, and whether VNSAs were using armed UAVs as a strategic weapon.⁹ The 2020 research explored the notion of strategic bombing by VNSAs, specifically asking whether or not VNSAs choose targets discriminately, have a mass casualty focus, and prefer soft targets when using armed UAVs.¹⁰ Target discrimination refers to whether attacks are carried out against specifically chosen targets. Soft targets are often defined as vulnerable targets that are difficult to protect and have a high likelihood of mass casualties in the event of a successful attack.¹¹ Mass casualty incidents are not defined through a fixed number of harmed individuals. Instead, the term is context-specific and refers to whether or not the incident overwhelms the local emergency and healthcare systems.¹² Specifically, this research note will present descriptive statistics on the distribution of UAV attacks across years, regions, various VNSAs, and types of targets (among other variables), and it will supplement and update the findings from the research published in 2020.

Methodology

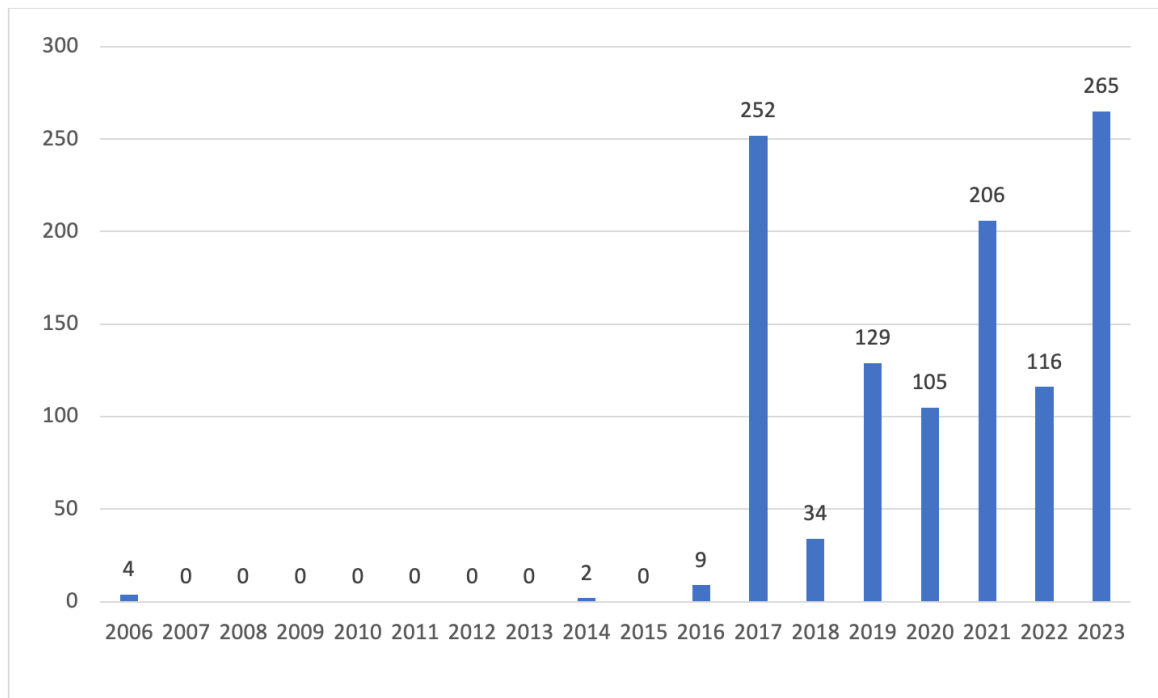
The dataset with records of VNSAs using UAVs in attacks spans from 2006 through 2023 and includes 1,122 incidents. The data collection of UAV attacks by VNSAs follows the same strategy as presented in the article published in 2020, which included: automatic Google alert search strings; a review of incidents reported in the Global Terrorism Database; the LiveUAMap; Bellingcat analyst Nick Waters' collection of ISIS UAV attacks; and a weekly search for articles, news reports, and research about non-state actors' use of UAVs.¹³ The data is managed using MS Excel with the XL STAT package, and is analysed with descriptive statistics. Please also see the note on the last page about ethical considerations and data privacy.

Results

Yearly Attacks

Figure 1 shows that there is a substantial variation in a number of UAV attacks each year. Until 2023, 2017 was the year with the most recorded UAV attacks by VNSAs.

Figure 1. Number of Attacks by Year



The high number of attacks in 2017 is almost exclusively related to ISIS's defence of Mosul and Raqqa. In 2023, a high number of UAV attacks were located in Iraq, Syria, Israel, and Yemen, and VNSAs such as Hamas, Hezbollah, the Houthis and various militias affiliated with Iran are responsible for the majority of attacks.

Geographic Locations

The Middle East and North Africa are by far the regions in which most VNSA UAV attacks occur (see Figure 2). From 2006 through 2023, 91.3 percent of all such attacks happened in this region. Figure 3 highlights the countries where three or more UAV attacks by VNSAs are recorded. Iraq is, with 248 recorded incidents, the country with the highest number of UAV attacks by VNSAs. This is similar to the reporting in the 2020 article. However, Saudi Arabia has now surpassed Syria as the country with the second-highest number of such attacks.

These are followed by Yemen and Israel, similar to the findings in the 2020 research.¹⁴ Additionally, as Figure 3 shows, there are 38 recorded UAV attacks located in the Red Sea. The attacks were recorded in the Red Sea if they were directed at a vessel in the Red Sea, or intercepted in the Red Sea while en route to a target in Israel, as was the case in many incidents in late 2023.

Figure 2. Number of Attacks by Region

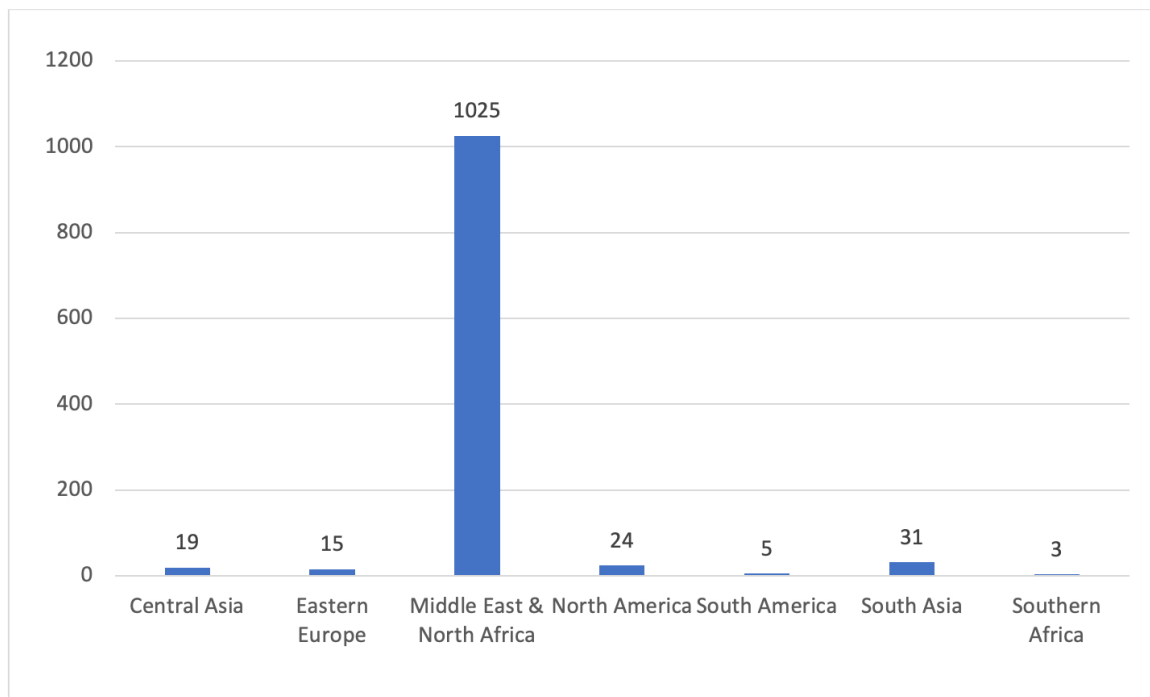
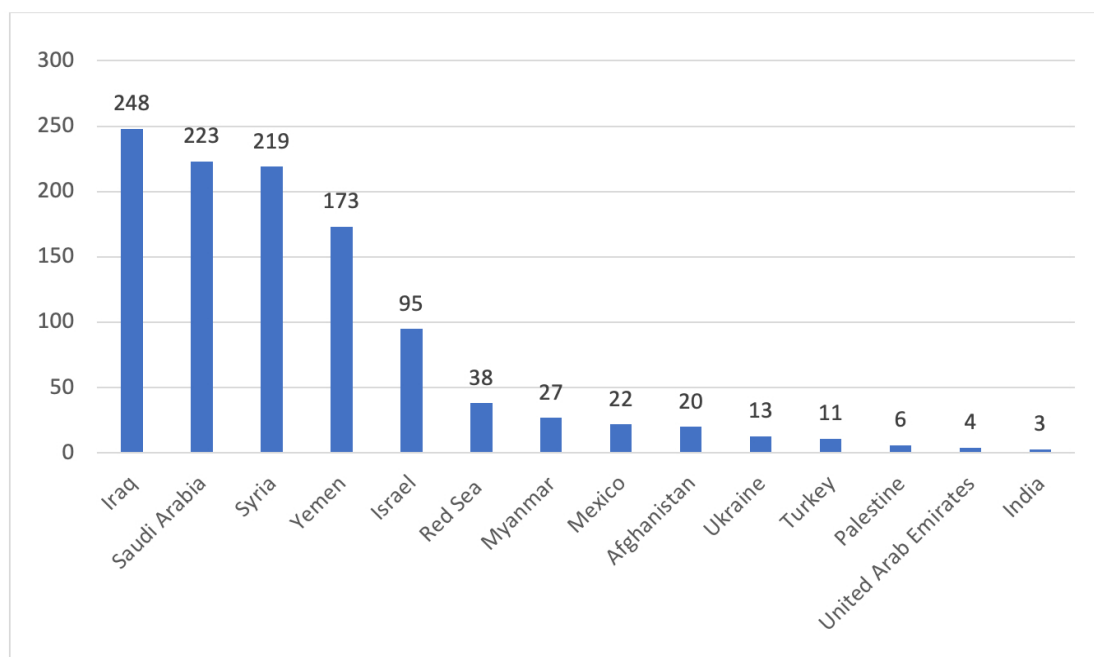


Figure 3. Number of Attacks by Country

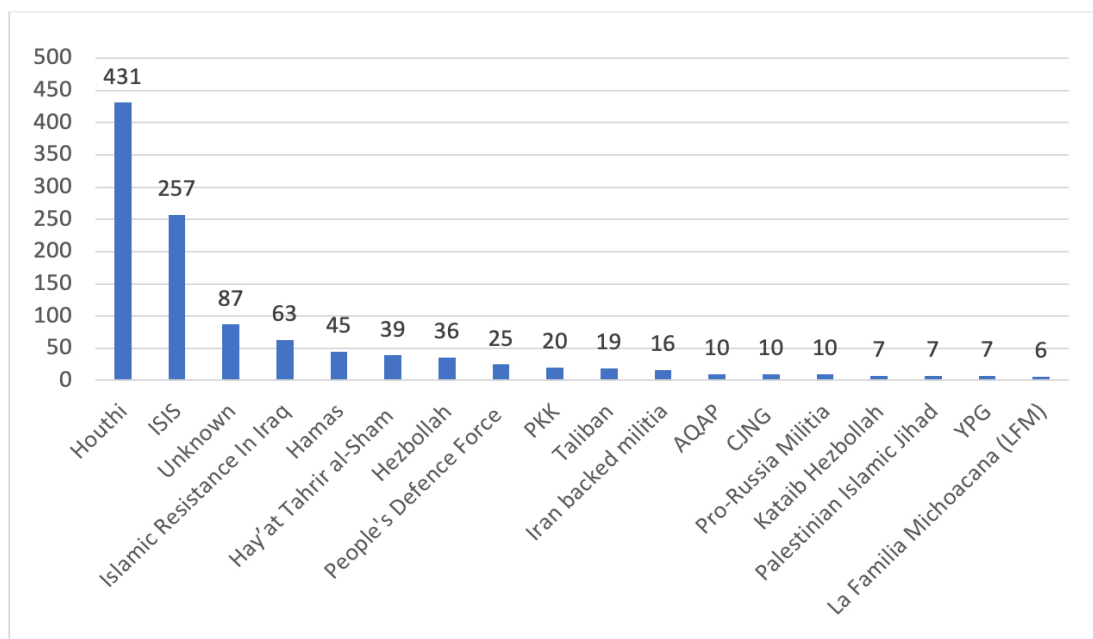


Two important countries to comment upon are Mexico and Myanmar. In Myanmar, the 27 recorded incidents primarily involve attacks conducted by the People's Defence Force (PDF) against the armed forces of the military junta, which in 2021 retook power in Myanmar.¹⁵ In Mexico, 22 incidents are recorded. These are connected to conflicts between cartels, often involving *Cártel Jalisco Nueva Generación* (CJNG), or between cartels and the Mexican military/police. Official statements from Mexico report a substantially higher number of attacks from cartels.¹⁶ However, the official statements do not provide details about the attacks. As such, the included incidents are incidents where factors such as date, location, and targets of attacks (among other variables) can be verified.

Responsible VNSA

Figure 4 shows the number of UAV attacks by a VNSA responsible for five or more attacks. This limitation is set for visual reasons, as a substantial number of VNSAs are linked to only one or two such attacks. The most notable distinction from the 2020 research is the number of attacks by ISIS, which is stable, and the comparatively high number of attacks perpetrated by the Houthis in Yemen. Additionally, various VNSAs with ties to Iran are often reported on as “Iran-affiliated militia”, or “Iran-supported militia”. Combined, the VNSAs with ties to Iran are responsible for 53.9 percent of all UAV attacks by VNSAs. In this assessment, the following VNSAs are considered as having ties to Iran: Houthis, Hamas, Hezbollah, Kataib Hezbollah, Palestinian Islamic Jihad, Islamic Resistance in Iraq, and the various Iran-backed militias in Iraq.

Figure 4. Number of Attacks by Various VNSAs

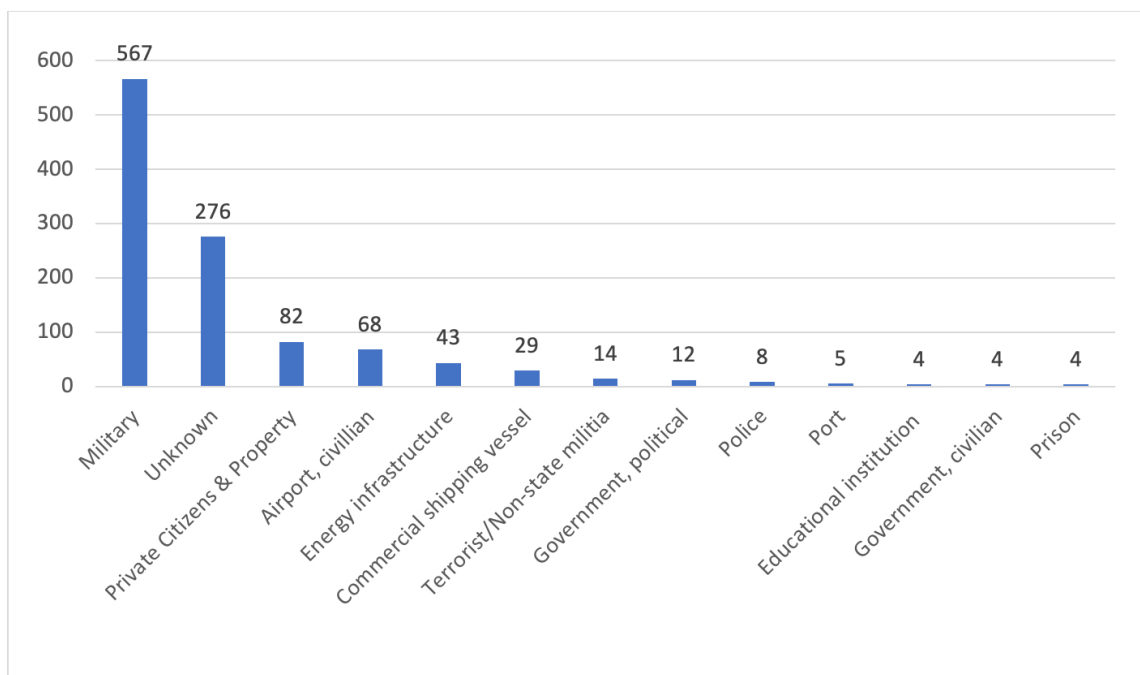


Targets

UAV attacks by VNSAs are directed at military targets in 50.5 percent of the recorded incidents (see Figure 5). This is a decrease compared to the results in the 2020 article, where 57 percent of attacks were directed at military targets.¹⁷ Compared to the findings in 2020, where 16.8 percent of the attacks had an unknown target, the entire data from 2006 to 2023 shows that 24.6 percent of the recorded attacks have unknown targets. The unknown target category occurs mainly in attacks where the UAV has been intercepted before it reaches its target.

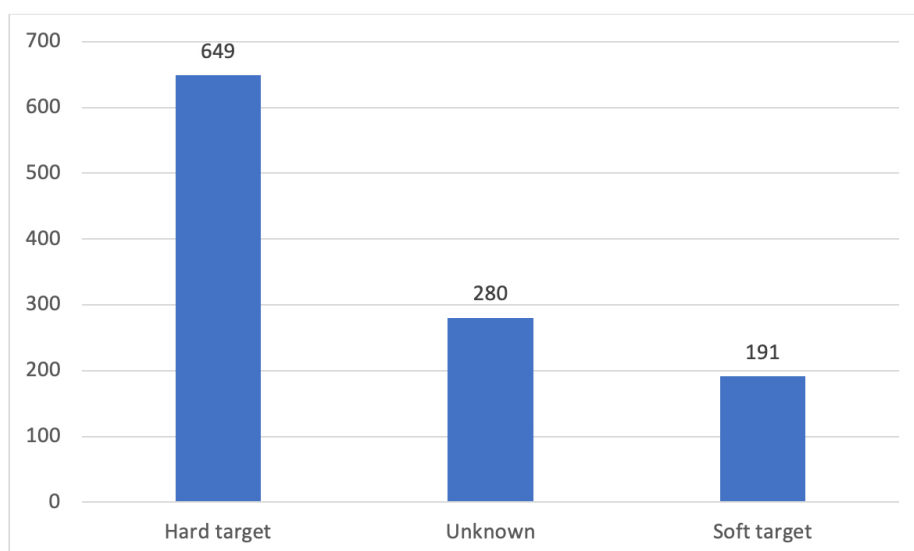
In terms of VNSAs using UAVs as a strategic weapon, bombing certain targets is likely to influence a policy change more than others, as they directly impact the lives of citizens in society. The Houthis stand out as a VNSA that, by choice or chance impacts such targets more than other VNSAs. The Houthis are responsible for 100 percent of the attacks against commercial shipping vessels, as well as 88.2 percent of the attacks against civilian airports. Additionally, the Houthis are responsible for the majority of attacks against energy infrastructure (such as oil refineries) and 28 percent of the attacks against private citizens and property.

Figure 5. Number of Attacks by Target Category



In the full dataset from 2006 to 2023, 57.8 percent of UAV attacks were directed at hard targets. This is a substantial decrease from the 71.4 percent hard targets reported in the 2020 article.¹⁸ One explanation for this is the number of unknown targets as reported above, as well as the result of a critical evaluation of each incident. It is also a consequence of the challenge to determine the characteristics of the target and to assess whether it is a hard or soft target. As an example, a civilian airport is in most cases not a location protected with advanced counter-UAV (CUAV) capabilities, such as a military compound or naval vessel. However, a civilian airport is likely a more secure location than an open area marketplace, a town square, or a small residential building, where unprotected and unprepared civilians are likely to be gathered. Similarly, a commercial shipping vessel or oil refinery is likely not outfitted with CUAV capabilities but is also not occupied by unprepared civilians. Hence, a civilian target is, in many cases, categorised as a hard target.

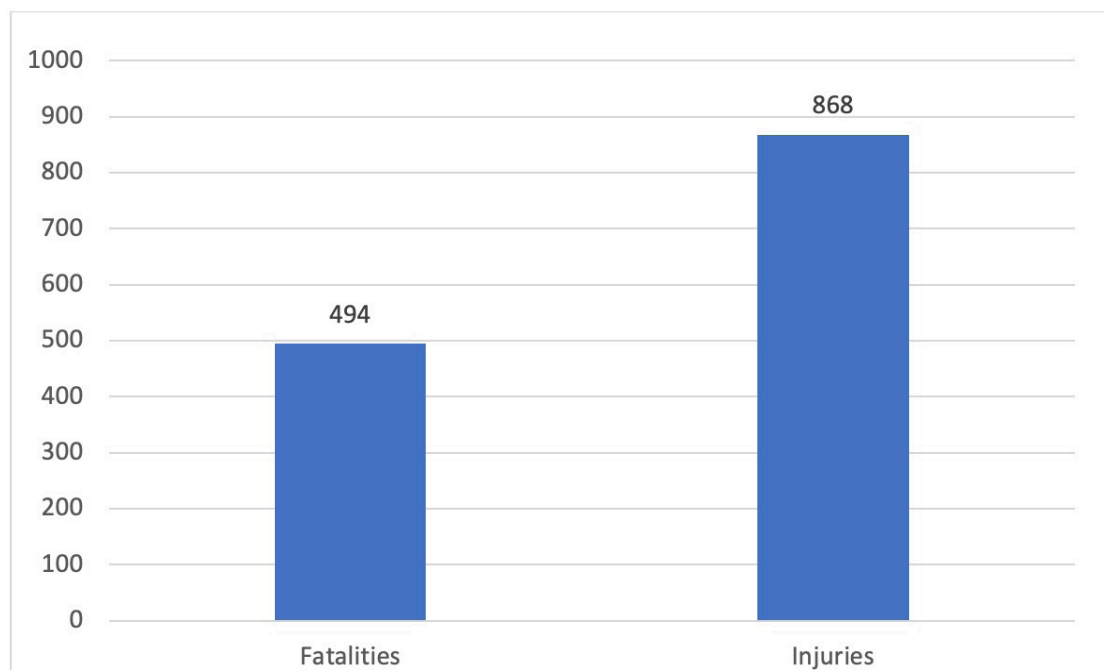
Figure 6. Number of Attacks on Hard and Soft Targets



Fatalities and Injuries

As shown in Figure 7, UAV attacks by VNSAs have resulted in 494 fatalities and 868 injuries. The number of fatalities and injuries from the UAV attacks was available in respectively 623 and 619 incidents, with a mean of 0.79 fatalities and 1.4 injuries per attack. However, in many of the cases where UAVs are used, as are rockets or missiles. Hence, the number of harmed in such attacks must also be attributed to these weapons as well. Additionally, two cases contribute considerably to these high numbers. First, a Houthi UAV and missile attack on a Yemeni military compound in Marib, Yemen, on 20 January, 2020 killed 111 and wounded 30 soldiers.¹⁹ Second, a UAV and missile attack on a military college in Homs, Syria, on 5 October, 2023 killed at least 89 and wounded over 300.²⁰ These two attacks skew the mean number of fatalities and injuries per attack, and this must be taken into account when reading the findings in this research note.

Figure 7. Number of Fatalities and Injuries from UAV Attacks

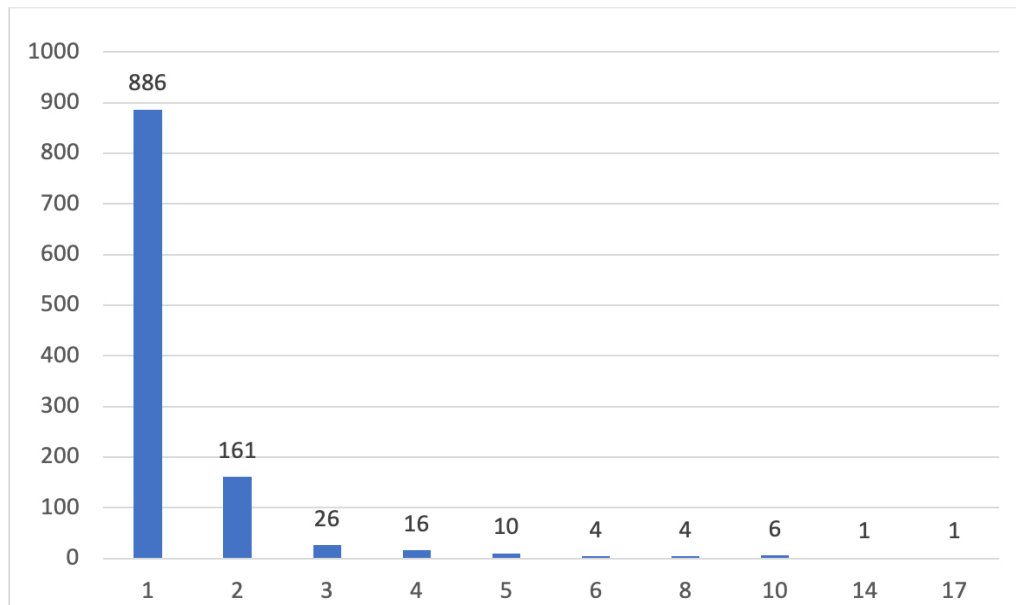


Number of UAVs Used in an Attack

For each UAV attack included in the dataset, the involvement of one single UAV was recorded unless otherwise specified. If the phrasing of the incident report contained “UAVs” in the plural, without specifying the number in use, two UAVs were recorded. Where the specific number of UAVs used was reported, that number was recorded. In the majority of attacks (79.0 percent), VNSAs use one single UAV. However, as Figure 8 shows, two UAVs were used in 161 (14.3 percent) attacks, and three UAVs were used in 26 attacks (2.3 percent). Additionally, two events stand out from the others. On 19 June 2021, the Houthis attacked a military base in Khamis Mushait, Saudi Arabia, using 17 armed UAVs.²¹

Later, on 16 December, 2023, the Houthis used 14 armed UAVs in an attack against commercial shipping vessels in the Red Sea.²² All of the UAVs were reportedly intercepted and destroyed in the above cases.

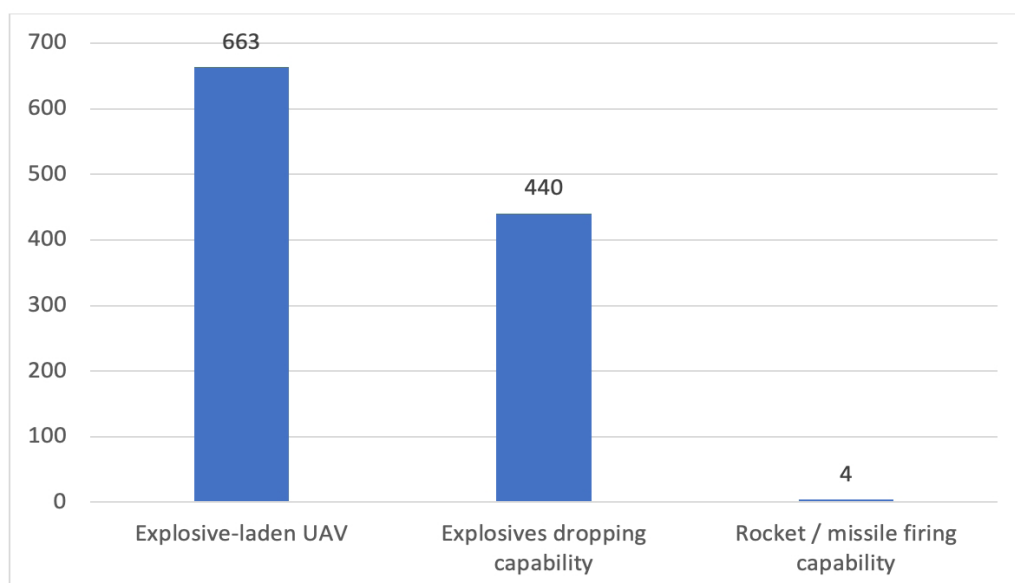
Figure 8. Number of UAVs Used in an Attack



Results of Attacks

This variable in UAV attacks by VNSAs refers to whether a UAV was able to impact its target. This occurs either in the case of loitering munition UAVs, flying into the target, or in the case of quadcopter-style UAVs dropping explosives onto a target below. When it is not possible to determine whether a VNSA UAV attack impacted its target or not, the attack is coded as having an unknown result. The findings indicate that 50.8 percent were successful, while 37.3 percent were intercepted by air defences or other defensive means. Additionally, in 11.9 percent of the incidents, it was not possible to determine the result of the attack from the available data. The results from the complete data from 2006 to 2023 vary from the findings presented in the 2020 article, particularly regarding the number of UAVs being intercepted. In the 2020 research, only 21 percent of attacks were recorded as intercepted.²³

Figure 9. Number of Successful, Intercepted, and Unknown-Result Attacks



Summary of Findings

2023 is the year with the highest number of recorded UAV attacks by VNSAs. The Middle East and North Africa remain the region where the majority of such attacks have happened from 2006 to 2023, particularly in Iraq, Saudi Arabia, Syria, and Yemen. The records of attacks in Mexico and Myanmar broaden the geographical dimension of VNSAs' UAV attacks in the updated dataset. The Houthis in Yemen are responsible for 431 UAV attacks, surpassing ISIS (with 257 UAV attacks). The Houthis are also accountable for UAV attacks that may have a strategic effect, as they stand out as the only VNSA currently targeting commercial shipping vessels, civilian airports, and energy infrastructures.

Additionally, VNSAs with ties to Iran are responsible for 53.9 percent of all UAV attacks by VNSAs. Military facilities and personnel are most frequently targeted by VNSAs' UAVs, accounting for 50.5 percent of all such attacks. Hard targets in general, where unprepared civilians are less likely to be located, account for 57.8 percent of all targets. Further, of the 1,122 recorded UAV attacks, 50.8 percent successfully reached their target, while 37.3 percent were intercepted by air defences. It was not possible to determine the result of the UAV attack in 11.9 percent of the incidents. Lastly, when VNSAs conduct an attack using UAVs, they use a single UAV in 79.0 percent of the attacks. However, there are 161 attacks where at least two UAVs were employed, and 26 attacks where three UAVs were used. In two extreme outliers, the Houthis used 17 UAVs in one attack and 14 UAVs in another.

The findings from the analysis of the updated dataset reveal that the patterns identified in the 2020 article persist.²⁴ VNSAs still choose targets discriminately, and direct most of their UAV attacks against hard or hardened targets, such as military targets or hardened civilian targets. As previously noted, the Houthis have a broader targeting strategy and direct their armed UAVs against civilian targets as well. There is however a challenge to identify the characteristics of every target without actually being on the ground, and with at times limited data available. Additionally, with a few exceptions, VNSAs' UAV attacks do not cause mass casualties. VNSAs' target discrimination towards challenging targets substantiates the finding that VNSAs do not actively seek to create a mass casualty incident with their UAV attacks.

Conclusion

This research has identified that VNSAs have been responsible for 1,122 UAV attacks from 2006 to 2023. VNSAs continue to use armed UAVs in attacks against primarily military targets, and primarily in the Middle East. As noted earlier, the prevalence of UAV attacks conducted by cartels in Mexico, and by forces fighting the military junta in Myanmar, produce a broader geographical distribution of UAV attacks than what was found in the 2020 article. Also, the Houthis are an outlier in two ways. First, they stand out as responsible for a high number of UAV attacks. Second, they also stand out regarding the type of targets of their UAV attacks. The Houthis are willing to direct their UAVs against civilians and essential targets for societal functioning, such as energy infrastructure and global trade. As such, the Houthis indicate through their actions that they use UAVs as a strategic weapon to influence policy among their nation-state counterparts. The use of armed UAVs by both nation-states and VNSAs and their showcasing of UAVs may facilitate the proliferation of UAVs by VNSAs beyond those who have already integrated UAVs into their repertoire.

Note on Ethical Considerations and Data Privacy

All data used in this research have been procured through open sources, such as reports in newspaper articles, thematic reports, as well as briefs from research institutions, to name a few. The initial data collection did not include incidents from social media. However, the data protection office [Personvernombudet] at the University of Stavanger considered the information about incidents reported on Twitter/X as public information. Hence, after discussing the use of incidents found on social media with the data protection office, this data source was also included in the research. As the data used in this research are all from open and publicly available sources, focused on incident information, the research has not been submitted for ethical evaluation to the Norwegian Centre for Research Data (NSD).

Håvard Haugstvedt holds a PhD in social sciences from the University of Stavanger, Norway. Haugstvedt is affiliated with the University of Stavanger, and conducts research on non-state actors' use of armed UAVs. Haugstvedt also conducts research on social work, social workers, and various preventive efforts, such as multiagency collaboration.

Endnotes

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About

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