

The Small-State Drone Advantage: A Study of the Russo-Ukraine War and Second Nagorno-Karabakh War

by

Michelle M.W. Hung

Department of Political Science  
Duke University

Defense Date: March 28, 2024

Approved:

David Siegel, Advisor

Kyle Beardsley

Peter D. Feaver

Thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts in the Department of Political Science in The Graduate School of Duke University  
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ABSTRACT

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## **Abstract**

In the field of emerging military technologies, combat drones have taken the center stage as a frequently used and publicized device. Emerging as a popular weapon of choice among governments as a counter-terrorist weapon, drone use has evolved from targeted strikes to prominent battlefield usage. Much of the literature on combat drones are drawn from the perspective of large states on the effectiveness of targeted drones strikes, drone proliferation and the ethics of drone use. Yet, little has been discussed regarding how unmanned aerial vehicles (UAVs) might change the dynamics of a small states place in the international community. This leads to the research question of this paper: Does the possession and use of unmanned combat aerial vehicles (UCAVs) enable small states to deter conflict or threats? Since its widespread proliferation, combat drones have been regularly used by small states in conflicts such as the 2020 Nagorno-Karabakh conflict and the Russo-Ukraine war. This research paper argues that with the increasing possession of UAVs by small-powered states, the number of conflicts should decrease as small states are gradually more able to withstand armed threats and entanglements with other actors.

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# 1. Introduction

Does the possession and use of unmanned combat aerial vehicles (UCAVs) enable small states to deter conflict or threats from large states? Combat drones have become a widely popularized military weapon and often discussed as a positive addition in decreasing death tolls. Much of the literature on UAVs focus on the perspective of the United States in its deployment of combat drones in targeted killings as a counterterrorist strategy. These scholars emphasize both the positive and negative ethical, legal and strategic aspects under which the American drone program is used. Instead of focusing on the position of large state drone use, this study seeks to explore if small state of drones can lead towards less conflict.

From much of the research conducted on UCAVs, there have been an emphasis that combat drones are unlikely to cause a huge impact on international relation dynamics (Calcara, Gilli, Gilli, Marchetti and Zaccagnini, 2022). Rather, some scholars have stressed that if drones were strategically used in tandem with the standing military of a country, there would be a higher effective utilization of drones in conflict (Borg, 2020). In other words, if properly integrated into the current military system of a small state, there is an increasing possibility of change in conflict dynamics with other weak states as well as large states. In combat drone literature, the chances of drones altering the international system is minimal. As drone proliferation increases and use of drones in conflict have spread widely, this study seeks to provide a general compiled dataset of drone possession and conflict.

Using a standard statistical model, the results indicate that the possession of small state drones does not directly correlate to an increase or decrease in conflict. Instead, the relationship between international alliances and drone possession contains a statistical significance. While the results do not clearly demonstrate a direct effect of drone possession on conflict, there is

inference of such a relationship through the link between international alliances and drone possession.

In addition to the statistical model, this paper will include case studies of the Russo-Ukraine War and the Second Nagorno-Karabakh conflict. The Russo-Ukraine War is an ideal example of how states in possession of drones are able to make wars more costly (Slantchev, 2003). This can lead to the assumption that states in the future might be more deterred from initiating conflict with a small state in possession of drones as it can inflict huge costs for both states. On the other hand, the Second Nagorno-Karabakh conflict demonstrates how states in possession of UCAVs are able to more effectively engage in conflict. In this scenario, there would be a rise in conflicts as states are able to efficiently wield combat drones.

This paper unfolds as follows: First, the paper will briefly outline the literature on combat drones as a whole and its contribution to the existing literature. Second, the paper will define the necessary terms relative to this article and present theories for possibilities of small state advantages in conflicts when in the possession of combat drones. The third section will present findings and analysis from the data. Fourth, the paper will present an additional case study on the Russo-Ukrainian war and the Second Nagorno-Karabakh War. The conclusion will briefly summarize the main argument and findings of the paper.

### ***1.1 Overview of Emerging Literature on UCAVs***

Unmanned combat aerial vehicles or combat drones have been used for almost a decade by militaries around the world; including, but not limited to, the United States, China, Israel, Iran, etc. with the recent addition of non-state actors. Initially part of the emerging military technologies of the 21<sup>st</sup> century, large combat drones have become an established part of battlefield use in the international community. Governments, especially the United States, have

established large UCAVs as the primary counterterrorist weapon in targeted leadership strikes. Additionally, some governments have extended combat drones usage to drone surveillance in contested territorial borders as well as intrastate policing. Along with increasing government UAV usage, the literature on drones have expanded into drone proliferation, ethical implications and drones as a coercive weapon. Even so, little of the literature sought to examine the perspective of combat drone usage from small states and the use of smaller drones.

The literature on combat drones largely rose after 9/11 and the subsequent targeted strikes deployed by the American government against terrorist organizations. Since then, there have been several waves of research on certain aspects of drone warfare. The first wave of literature on drone warfare focused on its proliferation and possibility of drones altering inter- and intrastate conflict dynamics (Luschenko and Maley, 2021). Similar to any new military weapon invention, scholars were focused on whether combat drones would encompass a cautionary tale or not if they came into the possession of non-state actors and autocratic states. The second wave of literature studied the effect and success of targeted strikes against terrorist organizations and leaders. This question continues to confound scholars who either argue targeted strikes as a successful operation breaking down terrorist organizations or that these strikes are ineffective (Jordan, 2014; Asfandyar, 2018; Rigterink 2021). Leading to the present-day, where scholars have expanded into asserting previous findings and steadily covering gaps in drone literature. The extension of literature explores crisis escalation through drone possession and their ability to coerce (Gartzke and Walsh 2022, 463-477; Lin-Greenburg 2022, 1737-1765). However, even with the establishment of drones as a tool of warfare, scholarship on UCAVs lack the distinct aspects of several areas including the use of drones in wars (outside of single controlled targeted strikes) as well as the impact of drones on the entire global order.

The recent scholarship of combat drones have slowly extended into understanding its effect on small state conflict. From the literature on drone proliferation, status seeking small states and certain regime types have been highlighted in their pursuit of acquiring combat drones (Horowitz, Schwartz and Fuhrmann, 2020). Yet, the emphasis in these articles is on the utilization of drones by autocratic states, non-state actors or states that cause human rights violations as potential drawbacks of proliferation. The focus on autocratic states and non-state actors narrow the study of drone utilization. Outside of proliferation, scholars have also come to view UCAVs as a potential coercive or deterrent combat tool. Employing wargames with military personnel, Lin-Greenburg found that when their own drones were targeted, responses leaned towards stabilization instead of escalating the conflict (Lin-Greenburg 2022, 1737-1765). In contrast to manned aircrafts that might cause injury or death, unmanned vehicles generally minimized the need for retaliation. In addition, drones allowed both sides of a conflict to obtain accurate intelligence and to survey contested territory or borders which would decrease the chances of civilian casualties. And instead of escalating conflict, drones have a chance of encouraging stabilization (Fuhrmann and Horowitz 2017, 397-418).

In summary, the literature on drone proliferation and coercion studied little on the effect of combat drones in small state conflict. While theories from both proliferation and coercion can be applied to small state drone usage, the literature does not fully delve into how UCAVs might impact geopolitical dynamics and wars. The few scholars that have sought to view conflict from the perspective of small states argue that drones can certainly impact minimal conflict interactions but only as an additional component without transforming the greater international security system (Borg 2020, 185-201). While this can certainly be true, the focus of these studies were on one small state that had not engaged combat drones in war.

Much of the gap in literature owes to the relatively recent development ofUCAV proliferation to small states. Widespread proliferation increasingly rose due to China's entrance into the armed drone export market and growing variety of drones available (Horowitz et al. 2020, 119-143). Another gap can be attributed to the lack of data on small state UAV usage where data is either largely classified or not diligently recorded. The available datasets onUCAVs are focused on drone use against terrorist organizations and not conditions involving two state actors or a war setting. These datasets largely record the United States use of drones in counterterrorist operations. Lastly, scholars focused on prioritizing large combat drones that could cause a high number of casualties in counterterrorist missions. Since governments used drones in settings constricted towards counterterrorist strategies, this limited the scope of analysis for scholars.

In trying to fill this gap in the literature of small state drone use, this study seeks to catalogue the effect of small state drone use and the subsequent potential decrease in conflicts.

## **2. Key Terms and Definitions**

### ***2.1 What are unmanned aerial vehicles or drones?***

Unmanned combat aerial vehicles (UCAVs) come in many shapes and sizes. Along with the variety of dimensions, scholars and governments do not have a universally recognized system of classifying them. Most of the combat drone classifications depend on the drone's weight and target range. The Missile Technology Control Regime (MTCR) founded in 1987 is an informal institution that arranges drones through their weight and range (Kreps 2016). Category I encompasses drones with a payload of over 1,102 pounds and a range of 186 miles or greater and Category II includes less sensitive materials. Another type of categorization is defined by the Government Accountability Office which base their drone rankings on altitude, range, and endurance. Mini drones have low altitude and short endurance while tactical drones have medium endurance. Strategic drones have medium to high altitudes and low endurance and range. According to the Joint Air Power Competence Centre (JAPCC), a NATO affiliated organization, another type of UAV classification can include the level of autonomy humans have on drones (Lt. Cl. Haider 2023). With the development of artificial intelligence as another emerging military technology, militaries have also integrated AI into unmanned aerial systems (UASs). On one side, the level of autonomy over a UAV is completely in the hands of a pilot, while on the other hand, AI is able to make the decisions with zero human involvement.

With the wide variety of UAV classifications, this paper will focus on combat drones that have the tactical capabilities to employ a targeted strike and conduct drone surveillance.

## ***2.2 What is a small/weak state? Big/strong state?***

In addition to UAV classification, it is necessary to understand what this paper's definition of big and small states. The definitions of big and small states have often been linked to a variety of criteria that make it difficult to clearly define whether a state is small or big (Maaz 2009, 65-83). Some of the forms of measurements include a state's economy, the population size or the geographical size. Since this paper's focus is on the possession of combat drones by a state's government, the definition of a small/weak state is largely dependent on its military size. A small state will employ a high form of soft power as they are unable to regularly engage in armed conflict. The military size of a small state should be limited and potentially unable to hold off direct armed conflict. A large/strong state will have the military ability to deescalate any type of armed conflict.

## ***2.3 Armed or unarmed conflict?***

The types of conflict included in this study will reflect the International Crisis Behavior (ICB) dataset. This will include both armed and unarmed conflict where the potential to lead towards a violent armed conflict can arise. The paper argues that small state possession of combat drones will decrease the number of any type of conflict, including nonviolent or encountering any potential triggers for a conflict to arise. Therefore, this study will include both types of conflict in understanding the effect of combat drone possession for small states.

### **3. Theoretical Argument and Hypotheses**

In the traditional dynamics of international relations, small or weak powered states are rarely able to stand on their own in conflicts of any kind; especially in ones against great powers. In international relations, the global system is mainly comprised of and developed by great powered states where little say is given to small state over the establishment of international norms and structures. Small state are viewed as being disadvantageous because they do not encompass a large economy or have enough material resources to be independent. Therefore, most IR scholars have been studying how small states can potentially place themselves in the international community in order to be less constrained. Scholars agree that for small states to survive, they either have to agree to an alliance with another state or remain passive in the global community. International relations term this strategy, band-wagoning, where small states seek to form alliances with either international organizations or great powers (Long 2017, 185-205). Band-wagoning might protect small states from some conflicts but it essentially sacrifices their independence and ability to make decisions regarding their sovereignty in international relations.

This study argues that with the development and proliferation of combat drones, weak states should become increasingly able to gain independence and engage in less disputes. The possession of UAVs by small states should indicate to great powers or other state actors that they are not to be trifled with. The number of disputes or international crises involving small states should also decrease. Other state actors will view instigating conflict with small states that have combat drones at their disposal as either being ineffective or potentially give rise to prolonged conflict. Small states might not respond in the way a large state would like them to and could change the nonviolent dispute into an armed conflict that is disadvantageous for a great power.

Moreover, if violent conflict is directed at the small state, there is a higher chance that with UCAVs, small states can hold off the adversary in invading their territory or influencing their decisions.

The first hypothesis (H1a) of this study argues that the weak or small state should be part of less conflicts because other states would view them as a formidable adversary. With the possession of the UCAVs, states would be deterred from wanting to either confront or trigger an armed conflict with the small state. On the other hand, as small states are increasingly able to defend themselves which can induce small states to initiate conflicts when they might have otherwise shied away from. This alternative explanation to H1a can lead to more conflicts for small states instead of less. The theory of increase conflict will be outlined in H1b.

*H1a: Small states in possession of combat drones will engage in less conflict as adversaries are more cautionary towards them.*

*H1b: Small states in possession of combat drones will engage in more conflict as they are increasingly able to defend themselves.*

From international relations theory, small states need to ally with great powers or strong states in order to be able to defend themselves in times of crisis. The existence of international alliances is often for the benefit of the weak state that can bandwagon with a strong state or hedge together against potential adversaries. This leads to the second hypothesis (H2) that weak states might engage in less international alliances as they come to possess combat drones.

*H2: A small state possessing combat drones will engage in less international alliances.*

An additional aspect of H2 that can lead small states to disengage from international alliances is the possibility of their allies preventing combat drone acquisition. Great powers have the ability to prevent UCAV proliferation to small states in order to maintain control over the formed alliance. Small states can see this restrictive alliance as impeding them from advancing their armed forces which can lead towards less international alliances.

## 4. Research Design

To test the hypotheses, this paper will employ a multi-variate linear regression using a dataset compiled from the International Crisis Behavior (ICB) and the Uppsala Conflict Data Program (UCDP). To view the effect of drone possession on a small states engagement with conflict, this study will need to compare weak states with drones to those without. The comparison will provide an answer to whetherUCAV possession does enable small states to have a higher deterrence rate against conflict. Additionally, alternative explanations for conflict initiation requires multiple control variables: regime type, gross domestic product, composite index of national capability and international alliance associations.

### 4.1 *Dependent Variable*

The unit of analysis in this study is the country dyad-year for conflicts starting from 2000 to 2020. Proliferation of drones increase in the 2000s once China entered into the export market which would mark the starting year for this study (Horowitz et al. 2020, 119-142).

The dependent variable is the conflict occurring in the dyad-year. The conflicts included in the dataset of this paper will only involve a small state in a dyad-year. There are multiple datasets on conflict, but because the possession of drones might not ultimately lead to violent armed conflict, this study depends on data that includes circumstances where states potentially engage in militarized conflict but refrain from doing so. Data on conflict is provided by the dyadic-level crisis dataset from the International Crisis Behavior (ICB) project (Brecher and Wilkenfeld 1997; Brecher, Wilkenfeld, Beardsley, James and Quinn 2023). The general ICB dataset defines a crisis from its trigger point which is defined as, "...the specific act, event or situational change which leads decision-makers to perceive a threat to basic values, time pressure for response and heightened probability of involvement in military hostilities." The different

trigger criteria include: (1) verbal act where there is a protest, threat or accusation, (2) political act from adversary alliance formation, diplomatic sanctions, etc., (3) economic act through embargos, nationalization of property, withholding of economic aid, (4) external change indicates whether there is a change in the global system, challenge to legitimacy, etc., (5) other non-violent acts, (6) non-violent military act through a show of force, war games, mobilization, movement of forces, (7) indirect violent act that occurs in another county directed at ally or violent act by ally against an adversary, and (8) a violent act where armed forces are involved. For the dyadic-level crisis dataset, a coded crisis requires three conditions, "... (1) both are members of the interstate system, (2) at least one of the states satisfies all three of the ICB necessary conditions for crisis involvement, and (3) at least one of the states has directed a hostile action against the other." The dyadic level dataset codes each year when the states were engaged in conflict. Since the ICB includes both violent and non-violent confrontations in the dataset, it is an optimal choice for this paper.

For the second hypothesis (H2), an alliance variable is included from the Formal Alliances dataset in the Correlates of War (COW) project (Gibler 2009). The dataset codes dyadic-yearly alliances between states from 1816 to 2012 and includes what type of alliance was formed. Types of international alliances include defense pacts, neutrality agreements, nonaggression pacts, entente and an asymmetric alliance.

Every dyad-yearly conflict in the ICB dataset that had a formal alliance would be coded as 1 for each year. The dyad would be coded as 0 if the alliance was not formed or ended the following year.

## ***4.2 Independent Variable***

The main independent variable will be small states that have UCAVs in their possession. This study will be using data from the Uppsala Conflict Data Program (UCDP) that contain instances of when a drone was used and who operated the drone in the conflict. The UCDP defines a state based armed conflict as, “a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one if the government of a state, results in at least 25 battle-related deaths in a calendar year.” (Davies, Pettersson and Öber 2022). The UCDP incorporates a variable for drone possession by indicating which state actor operated a combat drone in the dyad conflict. Moreover, the subject of countries included in the dataset is limited to the conflict dyad of the ICB dataset. Countries included in the statistical model are only those that have been in a potential crisis in the ICB dataset. Because there is little information available on when states obtained UCAVs, this paper will mark when states first used combat drones in an attack as drone possession. Additionally, this study seeks to analyze how drone possession in a small state will affect how an adversary responds, it is important that the international community should know the small states own UCAVs. When small states use combat drones in a conflict, it is a surefire way to alert the adversary. Therefore, for this paper, the starting point of drone possession will be identified when the small state utilized combat drones in a conflict.

If a small state has a drone in the conflict dyad-year, they will be coded with 1 from that year and onwards. If both states in the conflict dyad-year have combat drones in their possession, they will be coded as 2 for each following year.

### ***4.3 Control Variables***

The model also includes additional variables that account for alternative explanations for conflict among weak states. The COW project provides the composite index of national capability (CINC) score for each country from 1816 to 2016. The CINC score aggregates several components of a state's national material capabilities where 0 indicates that the state had 0% capabilities and 1 for 100% capabilities in that given year. The inclusion of the CINC score controls for an increase or decrease in conflict of small states because of their material capabilities. Similar to the CINC score, the gross domestic product (GDP) per capita is a prominent variable for controlling for economic capabilities that might influence a state's engagement with conflict. The GDP variable is gathered from the World Bank Database where the data is in constant 2015 US dollars (World Bank 2012).

Regime types might influence the likelihood of conflict engagement where less democratic states are more likely to instigate disputes. This can possibly impact the relationship between combat drone possession and conflict. To control for regime type, the model includes data from the Polity 5 Project which evaluates regime types on a 21 point scale with a +10 indicating consolidated democracy and -10 as hereditary monarchy (Marshall and Gurr 2020). Lastly, weak states often engage in international alliances in order to be drawn into less militarized disputes and have a stronger state fend off their adversaries for them. The development of alliances will impact whether states choose to engage in conflict or not. To control for international alliances, the COW dataset provides dyadic-yearly alliances between states (Gibler 2009).

## 5. Results and Discussion

Table 1 contains two models demonstrating the relationship between drone possession and militarized disputes. Both models indicate that there is no statistically significant relationship between combat drones and conflict. Model 1 and 2 use conflicts between states as the dependent variable. The bivariate regression in Model 1 solely examines the effect of UCAV possession on the chances of conflicts involving small states but has no statistical significance. From the multivariate regression in Model 2, a one unit increase in drone possession among small states only has a 0.009 increase in conflict. For each control variable in the model, there is a pair coinciding with either one of the states in a dyad. For example, in the Chad-Sudan crisis of 2006, the CINC score for Chad would be actor a and for Sudan be actor b. The same would apply for both the GDP per capita and the Polity scores. The coefficient estimate with statistical significance in Model 2 appears in the alliance formation variable with a p-value less than 0.05 and a coefficient where a country involved in an alliance is -2.0 percent less likely to be in a conflict.

**Table 1: Effect of drone possession on small-state crisis**

	Conflict	
	(1)	(2)
Drone Possession	0.007	0.009
	(0.007)	(0.023)
CINC Score (actor a)		0.365**
		(0.145)
CINC Score (actor b)		-0.169

		(0.110)
GDPa (constant 2015 US)		0.000000
		(0.000000)
GDPb (constant 2015 US)		-0.000001***
		(0.000000)
Polity Score (a)		0.0003
		(0.0003)
Polity Score (b)		-0.0002
		(0.0002)
Alliance Formation		-0.020**
		(0.010)
Constant	0.038***	0.047***
	(0.004)	(0.009)
N	3,182	1,560
R <sup>2</sup>	0.0003	0.030
Adjusted R <sup>2</sup>	-0.00002	0.025
Residual Std. Error	0.194 (df = 3180)	0.179 (df = 1551)
F Statistic	0.945 (df = 1; 3180)	5.922*** (df = 8; 1551)

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\* p < .1; \*\* p < .05; \*\*\* p < .01

Formal alliances become the dependent variable in Table 2 which lends support for H2 models that provide a relationship between UCAV possession and a decrease in international alliances. Model 1 is a bivariate regression focused solely on drone possession and alliance formation. The effect of drone possession among weak states decreases the chances of a formal alliance. Similarly in Model 2 where the other control variables are included in the statistical model, there is a significant decrease in formal alliances among small states with drone possessions.

**Table 2: Effect of drone possession on international alliances**

	Formal Alliances	
	(1)	(2)
Drone Possession	-0.262*** (0.061)	-0.253*** (0.061)
CINC Score (actor a)		-3.999*** (0.370)
CINC Score (actor b)		0.019 (0.293)
GDPa (constant 2015 US)		0.000001 (0.000001)

US)	GDPb (constant 2015		0.000000
			(0.000001)
	Polity Score (a)		-0.002***
			(0.001)
	Polity Score (b)		-0.002**
			(0.001)
	Constant	0.494**	0.506***
		(0.012)	(0.021)
	N	1,853	1,560
	R <sup>2</sup>	0.010	0.095
	Adjusted R <sup>2</sup>	0.009	0.091
	Residual Std. Error	0.498 (df = 1851)	0.475 (df = 1552)
	F Statistic	18.413*** (df = 1; 1851)	23.294*** (df = 7; 1552)

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\*p < .1; \*\*p < .05; \*\*\*p < .01

While hypothesis H1a and H1b did not demonstrate a significant relationship, there is a potential correlation between international alliances and drone possession for H2. A possible

reason for the non-significant relationship in H1 is the wide coverage of small states included in the dataset. The ICB dataset includes several small states in conflict but not every state was in possession of combat drones. Many of the small states that have started coming into possession and usedUCAVs in militarized conflicts is relatively recent. The effect of drone possession on conflict might be most applicable to a certain subset of weak states. In association with previous scholarship onUCAVs, the chance of being a successful militarized weapon mostly depends on being integrated into a state's military. The possible subset of weak states with a relationship with conflict engagement might be those that have fully managed to useUCAVs to their full potential. Additionally, the research design does not delve into the effect of drone possession over time and the possibility of extending conflicts. The study examines the onset of drone possession and each individual year thereafter which the small state was in a conflict. Possible future scholarship should investigate the relationship between drone possession and the prolongment of conflicts.

Another probable reason for the null relationship is because both hypotheses H1a and H1b are held true. A small state possessing combat drones might either be engaged in more or less conflict and the results could be demonstrating no average effect in the results. The statistical results indicate that there is slightly greater amount of conflict for small states with combat drones but as its number is almost at null, it is likely that more and less conflicts cancel each other out for each small state.

From H2, the association between drone possession and international alliances establishes a negative relationship. The possession of drones decreases the likelihood of engaging in more international alliances. This negative relationship can in turn point towards the potential of a subset of small states that decreases conflict as they are able to deter adversaries without a strong state ally with their possession ofUCAVs. Instead of invalidating H1, this result can

represent small states with combat drones are able to be resolute in conflicts and not necessarily need the direct military support that international alliances allow.

## **6. A case-study: the Russo-Ukraine War**

Beyond our statistical analysis that shows a possible burgeoning relationship between drone possession and conflict engagement, the Russo-Ukrainian War lends an opportunity to view the effects of drone possession and the prolongment of conflict. This case study is optimal in presenting how possession of drones can inflict high costs for both sides whether it is the attacker or targeted state. The following section will explore the recent Russo-Ukraine War and effect of UCAVs used by Ukraine.

The options for case studies involving combat drones on the battlefield is limited. Because drones have primarily been used by strong states in targeted strikes against terrorist organizations, there are few instances where UCAVs have actively taken part in conventional battlefield events. The most striking and recent example is the Russo-Ukrainian War where a wide variety of combat drones have been utilized by the Ukrainian government in their fight against a great power, Russia. Rather than engaging in more conflicts over the years after acquiring combat drones, Ukraine have instead managed to prolong the war that was largely viewed to be in favor of Russia (Kunertova 2023; Thompson 2024). Among many viewers of the war, several have pointed out the possible difference in this conflict being Ukraine's reliance on drones. Many of the drones have played an integral part in Ukrainian defensive and offensive tactics against Russia.

### ***6.1 Historical Background***

The conflict between Russia and Ukraine has been occurring for several years starting with the annexation of Crimea in 2014 when Russian troops took control of the region (Center for Preventive Action 2024). As Russia built up its military forces near the Ukraine border, negotiations began in February 2015 with France, Germany, Russia and Ukraine. The

negotiations called, the Minsk Accords, hoped to initiate a ceasefire, withdrawal of heavy weaponry and Ukrainian control throughout the conflict zone but were unsuccessful. Over the next few years, the international community would sanction several Russian officials as NATO increased its presence along the border of eastern Ukraine. The crisis reached alarming heights in October 2021 when a large amount of Russia troop activity was reported to be moving near the Russia-Ukraine border. Fighting between Russia and Ukraine eventually broke out in February 2022 when the Russian president, Vladimir Putin, announced a full-scale invasion of Ukraine while claiming their goal to demilitarize and denazify Ukraine. Initially thought to be a swift invasion, the war has continued for two years to the date. As the conflict eased due to Ukraine's surprising military defense, Russia withdrew its forces from, Kyiv, the capital of Ukraine.

In April, Russia launched another offensive attack on Ukraine and took over Mariupol (Center for Preventive Action 2024). The seizure of the port city caused a global food crisis as Ukraine, the world's largest exporter of grain, was unable to export food against Russian blockades. Following negotiations, Ukraine initiated a counteroffensive attack along the southern and northeast borders where they were able to retake parts of the Kharkiv region much to the surprise of Russia. In March 2023, Russia planned an offensive surge to take all of Donbas but failed to do so and ended in a months-long siege of Bakhmut.

Most recently, the conflict has reached a stalemate as Ukraine and Russia are both equally unable to rapidly advance.

## ***6.2 Role of Drones in the Russo-Ukraine War***

From the historical background on the Russo-Ukraine War, there is implicit evidence of a possible shift in power dynamics as Ukraine holds steady in its fight against Russia. This change can be attributed to the prominent usage of UCAVs among both Ukrainian and Russian forces.

The Ukrainian military forces utilized both large and small classes of drones. At the beginning of the conflict in 2022, Ukraine relied heavily on larger drones such as the Turkish TB2 Bayraktar (Thompson 2024). The TB2 Bayraktar is considered a large III class drone with the ability to deliver firepower over long ranges (300 km) and strike targets at an altitude of 7 km (Kunertova 2023, 95-102). Ukraine was able to use the TB2 for their advantage at the beginning of the conflict when Russia was less developed in its air defense and electronic-warfare capabilities (Thompson 2024). In addition, Ukraine was able to effectively use the TB2s as decoys that deflected Russian air defense systems to allow for Ukraine's missiles to directly target Russian cruisers (Kunertova 2023). However, later on, Russia was able to detect and shoot down many of the TB2 drones which had Ukraine reverting to small drones in the conflict. On the other hand, Russia has developed their own large class of drones, the Orion combat drone, but are unable to fully utilize them. They have also come into possession of Iranian-supplied Mhajer-6 drones, similar to the TB2. The Orion and Mhajer-6 drones depend on Russian systems that have proven unreliable as Russia has gradually lost several drones in the conflict. The wide popularity and notable presence of large drones does not translate to a beneficial use of them on the battlefield, especially when no one side has air superiority, as is the case for the Russo-Ukraine War (Kunertova 2023). Rather, the conflict has highlighted the relative advantage of small drones.

Small class I drones carry payloads less than 10 kg and are largely easy to obtain. Ukraine and Russia have acquired many of these hobbyist drones through "dronations" from their populations or from crowdfunding campaigns (Kunvertova 2023). The hobbyist drones include, but are not limited to, AliExpress, Amazon and the Chinese commercial DJI Mavic mini drones that are repurposed by Ukraine and Russian armed forces for spying and fit with makeshift

explosives. With relatively low costs, these drones have become a favored weapon. The small drones avoid blind shelling and a reconnaissance advantage that enable troops on the ground to be more aware of enemy movements, minimizing the damage on human armed forces. Similar to the small drones, kamikaze drones or loitering munitions have also become an important weapon in the conflict. More beneficial to Russia through the use of Iranian-made Shahed-136 kamikaze drones, these drones allow Russia to strike deeper into Ukrainian territory and are cheap to purchase. Yet, Ukraine has also found success through its own innovative take on loitering munitions. Ukraine has launched several attacks on Russian naval fleets and airbases using long-range loitering munitions where the damage caused on Russian troops has indicated the increasing success of Ukraine's development in drone technology. From the Russo-Ukraine War, drones have demonstrated the possible advantage provided for states if effectively integrated into the armed forces.

Beyond the deployment of UCAVs, counter-drone technology has become especially beneficial for Ukraine. Ukraine has access to counter-drone technologies provided by NATO which can track drones and use high-energy lasers to shoot them down (Mittal 2022). For Russia, because of technology embargoes and the lack of a domestic industrial base, their counter-drone technology that can be easily detected by Ukraine armed forces. Ukraine have already successfully destroyed three of Russia's counter-drone systems so far.

Rather than clearly pinpointing UCAVs as a game-changing weapon, the Russo-Ukraine war has exhibited that the combination of drones and technological innovation is key in providing the small state with an advantage in conflicts. Previously, Ukraine had only seven domestic drone manufacturers, but since the start of the conflict, the number of manufacturers have increased to at least eighty (Thompson 2024). Much of the slight edge that the Ukrainian armed forces

obtained is their willingness to transform and aptly integrate drones in the present military for the battlefield. Repurposing small “hobbyist” drones to carry explosives, provide reconnaissance and shorten the time of hitting a target, the Ukrainian armed forces are able to withstand the massive military invasion led by Russia. Furthermore, the Russo-Ukrainian War has provided other small states an example of how less sophisticated weapons, if effectively innovated and integrated, can increase chances towards their advantage in conflicts. Proliferation of military and commercial drones will increasingly rise and can cause future armed conflicts to become asymmetric (Kunertova 2023). The technology used to strike down drones is sophisticated and expensive with no reassurance of being able to do so against loitering munitions or “hobbyist” drones. The easy acquirement of small drones will provide an unbalanced perspective on future battlefields.

## **7. An additional case study: The Second Nagorno-Karabakh War**

Compared to the Russo-Ukraine War, the Second Nagorno-Karabakh War is a demonstration of how the possession of combat drones enable small states to engage in more conflicts on the offensive instead of continuously defending themselves after the initiation of a conflict. This is a fitting case study as the small state, Azerbaijan, through their possession of a range ofUCAVs was able to initiate conflict with another state, Armenia. The war is a presentation of the potential rise for future conflicts when small states increase their military power through the acquisition of drones.

For decades, the Nagorno-Karabakh region has been a long contested land between Armenia and Azerbaijan. The region is recognized as a part of Azerbaijan but contains a largely ethnic Armenian population (Droin, Dolbaia, and Edwards 2023) . The tense dispute between the two states began in the first Nagorno-Karabakh War in 1988 to 1994 when the Nagorno-Karabakh region declared their independence from Azerbaijan (Center for Preventive Action 2024). Near the end of the first war, Armenia was able to gain control of the region while Russia issued a ceasefire in 1994 that left the region a self-proclaimed independent government reliant on Armenia. Skirmishes and cross-border attacks continued between the two states over the years until late September 2020 when the second Nagorno-Karabakh War broke out. The conflict was initiated by Azerbaijan when their president announced the aim to neutralize the “illegal” Nagorno-Karabakh government (Droin, Dolbaia, and Edwards 2023). The war lasted six weeks and led to seven thousand soldiers and civilians killed with a hundred more soldiers wounded (Center for Preventive Action 2024). A ceasefire was negotiated when Russia brokered a deal to provide up to 1,960 Russian peacekeepers in the Lachin corridor, a transit route between Armenia

and Nagorno-Karabakh. The resulting outcome of the conflict was Azerbaijan reclaiming a large portion of the region they had lost in the first war.

### ***7.1 Azerbaijan UCAV Advantage***

Before the eruption of the second Nagorno-Karabakh War, Azerbaijan was reported to have acquired TB2 drones from Turkey in June of 2020 (Shaikh and Rumbaugh 2020). In addition to the TB2, Azerbaijan has also purchased several Israeli loitering munitions or kamikaze drones. On the other hand, Armenia inherited most of their missiles and drones from the Soviet Union after its collapse. The result was Azerbaijan with a diverse arsenal of drones while Armenia using outdated combat drones and was sorely lacking in its advanced air power.

In contrast to the Russo-Ukraine War, the second Nagorno-Karabakh War demonstrated how a small state possessing UCAVs could initiate a conflict on the offensive. Azerbaijan was able to successfully utilize combat drones to their advantage through a combination of well-executed tactics, integration with their armed forces and intelligence preparations (Calcara et al. 2022). In the conflict, Azerbaijan utilized combat drones in targeted strikes to disable T-72 and S-300 Armenian air defense systems (Shaikh et al. 2020). Armenia was unable to effectively target Azerbaijan deployed TB2s and lacked the effective counter-drone systems to prevent attacks of their own advanced air systems.

## 8. Conclusion

This study sought to examine the relationship between UCAV possession and small-state conflicts. While the statistical analysis of drone possession and conflict did not demonstrate a significant relationship, it did highlight potential areas for future research. The rapid technological development of drones creates a gap between academic scholarship and government use. As drones continue to become more advanced, future scholarship must continue to scrutinize the use of combat drones in conflicts.

The Russo-Ukraine War case study has demonstrated how small-states that might initially be viewed as weak in facing a great power can still hold onto sovereignty with drone use gradually. This is further demonstrated in the Second Nagorno-Karabakh War where Azerbaijan engaged in a conflict initiation that might not have been possible before combat drone acquirement. In the case of the Nagorno-Karabakh War, the initiation of conflict from a small state can provide an example for how small states should deter potential conflicts in the future. An example is the current geopolitical tension between Taiwan and China where Taiwan through the use of UCAVs in the porcupine strategy can deter China. Future research might want to delve into how drone possession provides small states with the advantage of prolonging the war to stand its ground. Furthermore, while drones have existed for a while, their use in battlefield conditions between two states is still new. Still prominently used in one-sided targeted counter-terrorist strikes, the Second Nagorno-Karabakh War and recent Russo-Ukraine war have been the only case studies of highly observed and well established uses of combat drones in the battlefield. There is potential to apply a wargame scenario methodology to UCAV use in conflicts between two states.

## Bibliography

- Borg, Stefan. 2020. "Assembling Israeli drone warfare: Loitering surveillance and operational sustainability." *Security Dialogue* 52, no. 5: 401-417.  
<https://doi.org/10.1177/0967010620956796>.
- Borg, Stefan. 2020. "Below the radar. Examining a small state's usage of tactical unmanned aerial vehicles." *Defense Studies* 20, no. 3 (Jun): 185-201.  
<https://doi.org/10.1080/14702436.2020.1787159>.
- Brecher, Michael and Jonathan Wilkenfeld. 1997. *A Study of Crisis*. Ann Arbor: University of Michigan Press.
- Brecher, Michael, Jonathan Wilkenfeld, Kyle Beardsley, Patrick James and David Quinn. 2023. *International Crisis Behavior Data Codebook, Version 15*.  
<https://sites.duke.edu/icbdata/data-collections/>.
- Calcara, Antonio, Andrea Gilli, Mauro Gilli, Raffaele Marchetti and Ivan Zaccagnini. 2022. "Why Drones Have Not Revolutionized War: The Enduring Hider-Finder Competition in Air Warfare." *International Security* 46, no. 4 (Spring): 130-171.  
[https://doi.org/10.1162/isec\\_a\\_00431](https://doi.org/10.1162/isec_a_00431).
- Center for Preventive Action. 2024. "War in Ukraine." *Council on Foreign Relations*. Updated March 6, 2024. <https://www.cfr.org/global-conflict-tracker/conflict/conflict-ukraine#RecentDevelopments-1>.
- Center for Preventive Action. 2024. "Nagorno-Karabakh Conflict." *Council on Foreign Relations*. Updated March 20, 2024. <https://www.cfr.org/global-conflict-tracker/conflict/nagorno-karabakh-conflict>
- Davies, Shawn, Therese Pettersson & Magnus Öberg. 2022. "Organized violence 1989-2021 and drone warfare." *Journal of Peace Research*, 59(4).
- Drion, Mathieu, Tina Dolbaia, and Abigail Edwards. 2024. "A Renewed Nagorno-Karabakh Conflict: Reading Between the Front Lines." *Center for Strategic & International Studies*. Updated September 22, 2023. <https://www.csis.org/analysis/renewed-nagorno-karabakh-conflict-reading-between-front-lines>
- Fuhrmann, Matthew and Michael C. Horowitz. 2017. "Droning On: Explaining the Proliferation of Unmanned Aerial Vehicles." *International Organization* 71, no. 2: 397-418.
- Gartzke, Erik and James Igoe Walsh. 2022. "The drawbacks of drones: The effects of UAVS on escalation and instability in Pakistan." *Journal of Peace Research* 59, no. 4 (February): 463-477.
- Gilber, Douglas M.. 2009. *International military alliances, 1648-2008*. CQ Press.

- Grieco, Kelly A. and J. Wesley Hutto. 2021. "Can drones coerce? The effects of remote aerial coercion in counterterrorism." *International Politics*.
- Haider, Lt. Cl. Andre. 2023. "Introduction." In *A Comprehensive Approach to Countering Unmanned Aircraft Systems*. <https://www.japcc.org/chapters/c-uas-introduction/>.
- Horowitz, Michael C., Sarah E. Kreps and Matthew Fuhrmann. 2016. "Separating Fact from Fiction in the Debate Over Drone Proliferation." *International Security* 41, no. 2 (Oct.).
- Horowitz, Michael, Joshua A. Schwartz, and Matthew Fuhrmann. 2020. "Who's prone to drone? A global time-series analysis of armed uninhabited aerial vehicle proliferation." *Conflict Management and Peace Science* 39, no. 2: 119-142. <https://doi-org.proxy.lib.duke.edu/10.1177/0738894220966572>.
- Jordan, Jenna. 2014. "Attacking the Leader, Missing the Mark: Why Terrorist Groups Survive Decapitation Strikes." *International Security* 38, no. 4: 7–38.
- Kreps, Sarah. 2016. *Drones: What Everyone Needs to Know*. Oxford University Press.
- Kunvertova, Dominika. 2023. "Drones have boots: Learning from Russia's war in Ukraine." *Contemporary Security Policy* 44, no. 4 (Oct.): 576-591. <https://doi.org/10.1080/13523260.2023.2262792>.
- Lin-Greenberg, Erik. 2022. "Wargame of Drones: Remotely Piloted Aircraft and Crisis Escalation." *Journal of Conflict Resolution* 66, no. 10 (June): 1737-1765.
- Long, Tom. 2017. "Small States, Great Power? Gaining Influence Through Intrinsic, Derivative, and Collective Power." *International Studies Review* 19, no 2: 185-205. <https://www.jstor.org/stable/26407895>.
- Lushenko, P., Bose, S., & Maley, W. 2021. (Eds.). *Drones and Global Order: Implications of Remote Warfare for International Society* (1st ed.). Routledge.
- Maas, Matthias. 2009. "The elusive definition of the small state." *International Politics* 46: 65-83. <https://doi-org.proxy.lib.duke.edu/10.1057/ip.2008.37>.
- Mir, Asfandyar and Dylan Moore. 2019. "Drones, Surveillance, and Violence: Theory and Evidence from a US Drone Program." *International Studies Quarterly* 63, no. 4: 846-862.
- Mir, Asfandyar. 2018. "What Explains Counterterrorism Effectiveness?" *International Security* 43, no. 2: 45-83.
- Mittal, Vikram. 2022. "Puzzling Out the Drone War Over Ukraine." *IEEE Spectrum*. Last modified March 25, 2022. <https://spectrum.ieee.org/ukraine-drone-war>.
- Rigterink, Anouk S. 2021. "The Wane of Command: Evidence on Drone Strikes and Control within Terrorist Organizations." *American Political Science Review* 115, no. 1: 31-50.

- Schwartz, Joshua A., Matthew Fuhrmann, Michael C. Horowitz. 2022. "Do Armed Drones Counter Terrorism, Or Are They Counterproductive? Evidence from Eighteen Countries." *International Studies Quarterly* 66, no. 3 (Sept.).
- Shaikh, Shaan and Wes Rumbaugh. 2020. "The Air and Missile War in Nagorno-Karabakh: Lessons for the Future of Strike and Defense." *Center for Strategic & International Studies*. Updated December 8, 2020. <https://www.csis.org/analysis/air-and-missile-war-nagorno-karabakh-lessons-future-strike-and-defense>
- Singer, David J., Stuart Bremer, and John Stuckey. 1972. "Capability Distribution, Uncertainty, and Major Power War, 1820-1965." In Bruce Russett (ed) *Peace, War, and Numbers*, Beverly Hills: Sage, 19-48.
- Singer, J. David, and Melvin Small. 1966. "Formal Alliances, 1815-1939." *Journal of Peace Research* 3:1-31.
- Slantchev, Branislav L.. 2003. "The Power to Hurt: Costly Conflict with Completely Informed States." *American Political Science Review* 97, no. 1 (March): 123-133. doi: 10.1017/S000305540300056X.
- Thompson, Kristen D. 2024. "How the Drone War in Ukraine is Transforming Conflict." *Council on Foreign Relations*. Last modified January 16, 2024. <https://www.cfr.org/article/how-drone-war-ukraine-transforming-conflict>.
- The World Bank. 2012. "World Development Indicators: GDP per capita (constant 2015 US\$)." Accessed 2024. <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD?end=2022&start=1960&view=chart>.