

# War in Ukraine: Principles of Warfare and Aerospace Power

*Guerra en Ucrania: principios de la guerra y el poder aeroespacial*

*Guerra na Ucrânia: princípios de guerra e poder aeroespacial*

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## ABSTRACT

The War between Russia and Ukraine raises possibilities for analysis for the employment of Aerospace Power. The article uses the principles of war as theorized by Antoine-Henri Jomini and Carl von Clausewitz as a tool for analysis of aerospace warfare in this conflict. Through a survey of facts observed in the war from news websites, academic institutes, and social media, it points out relationships between principles of war and the events of the conflict, concerning the employment of the Russian Aerospace Force and the Ukrainian Air Force. In addition to inferences that exemplify the application of the principles, the main contribution of the article is to identify those principles of war, originally designed for surface warfare, can be extrapolated to contextual analyses of aerospace warfare.

**Keywords:** War in Ukraine; Aerospace Power; principles of War.

## RESUMEN

*La guerra entre Rusia y Ucrania plantea posibilidades de análisis para el empleo del Poder Aeroespacial. El artículo utiliza los principios de la guerra teorizados por Antoine-Henri Jomini y Carl von Clausewitz como herramienta de análisis de la guerra aeroespacial en este conflicto. A través de un estudio de los hechos observados en la guerra a partir de sitios web de noticias, institutos académicos y medios de comunicación social, señala las relaciones entre los principios*

*de la guerra y los acontecimientos del conflicto relativos al empleo de la Fuerza Aeroespacial Rusa y la Fuerza Aérea Ucraniana. Además de las inferencias que ejemplifican la aplicación de los principios, la principal contribución del artículo es identificar que los principios de la guerra, originalmente diseñados para la guerra de superficie, pueden extrapolarse a los análisis contextuales de la guerra aeroespacial.*

**Palabras-clave:** Guerra en Ucrania; Poder Aeroespacial; principios de la Guerra.

## RESUMO

*A Guerra entre a Rússia e a Ucrânia suscita possibilidades de análise para o emprego do Poder Aeroespacial. O artigo utiliza os princípios de guerra conforme teorizados por Antoine-Henri Jomini e Carl von Clausewitz como ferramenta de análise da guerra aeroespacial nesse conflito. Por meio de um levantamento de fatos observados na guerra, oriundos de sites de notícias, institutos acadêmicos e mídias sociais, aponta relações entre princípios de guerra e os eventos do conflito relativos ao emprego da Força Aeroespacial Russa e da Força Aérea Ucraniana. Além das inferências que exemplificam a aplicação dos princípios, a principal contribuição do artigo é identificar que princípios de guerra, originalmente concebidos para a guerra na superfície, podem ser extrapolados para análises contextuais da guerra aeroespacial.*

**Palavras-chave:** Guerra na Ucrânia; Poder Aeroespacial; princípios de Guerra.

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The acronyms and abbreviations contained in this article correspond to the ones used in the original article in Portuguese.

## 1 INTRODUCTION

The war between Ukraine and Russia effectively began in 2014 after turbulent political events that led then-President Viktor Yanukovich to flee the country, and obtain political asylum from the Kremlin, in the face of his refusal to expand the country's integration agreements with the European Union. Russian troops invaded Ukraine in March of that year, occupying the Crimean peninsula, which was unilaterally incorporated into Russian territory. The events of 2022 can be considered a continuation of this war, with the first military movement taking place on February 24 in what the Russian government termed a special military operation (Furseev, 2022).

Until this moment it is unclear what the real political motivation is that led President Vladimir Putin to resume the war in Ukraine. There are hypotheses that are raised around Russian politico-strategic goals. There is the issue of the expansion of the North Atlantic Treaty Organization (NATO), which would impose threats to Russia's regional security, including with the possible accession of Ukraine to that treaty. There is also the issue of the claimed independence of the Ukrainian provinces of Luhansk and Donetsk, situated in the Donbass region, where there is the presence of pro-Russian separatist groups (Center for Preventive Action, 2022), and the majority of the population (74.9% in Donetsk and 68.8% in Luhansk) are native Russian speakers (UKRAINE, 2004). Another hypothesis is the demand for a geographic land connection between the Caucasus region and the port of Sevastopol in Crimea, which houses a significant portion of Russia's maritime capacity to access the Mediterranean Sea (DINIZ, 2022).

Russian military operations in this current phase of the war have often been analyzed, even in the face of a lack of more precise information about the campaign plans of each of the contenders, or what is actually happening on the battlefield in terms of successes and damage analysis. We should point out that analyses on the performance of the Russian Aerospace Force (VKS) and the Ukrainian Air Force (PSU) are still covered with doubts and misinterpretations, given that the context of information warfare, conducted by both Russia and Ukraine, limits the access and qualification of sources, often restricted to electronic media and social networks (especially *Twitter* and *YouTube*). This, in

addition to imposing an analytical limitation, may raise the possibility of discordant interpretations about the application of the principles and their connection to war aerospace in the conflict at hand.

Despite these difficulties, inherent to the context of information warfare (PEREZ; NAIR, 2022), journalistic evidence, social media reports, and *think tank* assessments can enable studies that focus attention on certain aspects of war, especially when supported by classic strategic studies theoretical frameworks.

This article, therefore, sets out to combine empirical elements obtained from reading some evidence of the war, notably derived from periodicals and articles covering the conflict, with how Antoine-Henri Jomini (1865) and Carl von Clausewitz (2014) discussed principles of war. Although these are principles applied to war on the surface, the article sets out to extrapolate the understanding of the maxims contained in these principles to the peculiarities of aerospace warfare conducted in the 2022 conflict between Russia and Ukraine.

## 2 METHODOLOGICAL CONSIDERATIONS

There are different methodologies for analyzing armed conflict. Purely quantitative approaches (LANCHESTER, 1916; JARAUSCH; HARDY, 1991) based on the comparison of combatant power are relevant for the understanding of the capabilities involved, but are insufficient to point out certain explanations that go beyond the simple contrast of numbers or technologies. From a qualitative point of view, there are several ways to interpret the performance of a given armed force in an armed conflict (VOTAW, 1988). The first and most traditional is the analysis based on the historical experience of the armed force (COLLINS, 2002). In this case, the method of observing how it has acted in recent past situations allows the analyst to conjecture some explanations that go beyond the quantitative question.

The analysis can also be conducted from an understanding of the organizational structures of the armed forces. How they are organized, both operationally and logistically, enables inferences about the application of these structures in military campaigns (WINNEFELD; JOHNSON, 1993). A common current issue in this method is how the army, navy, and air force act together. This form of analysis can be derived into a category that deals with the doctrine of operation.

For the most part, doctrines are inspired by war theory and practical experience. In the case of theory, there are need to resort to the systematizations that have been produced by theorists in light of what they have studied. One of the most influential theoretical elements in analyses of armed conflict are the principles of war. According to Sude (1994, p. 786) the principles of war promote “military expertise [and] serve as appropriate standards of comparison for the evaluation and analysis” of military operations.

Throughout history, mainly by theorizing about and observing land warfare, many thinkers have attempted to enumerate principles of warfare. The purpose of this enumeration was to identify characteristics in the conduct of military operations that, in theory, would show patterns that would lead commanders to succeed in their campaigns. Certainly, this kind of understanding was criticized and, as Schneider (1998, p. 38) points out, principles of war cannot “be applied as a mere checklist” to achieve a positive outcome. In the present paper, the methodological premise is to observe whether the principle is applied or not. The value judgment will derive from the source consulted, and the proposal of the author of this article is to explain the relationship between fact and principle.

Another issue that has a direct impact on the methodology of analysis is the consideration that principles of war commonly studied in land-based military campaigns can be studied from the perspective of employing aerospace power or in what is called aerospace warfare (ROSA, 2014). Twining (WESTENHOFF, 2007) had already warned about this difficulty when he posited that the “principles of war derive from periods in history in which airplanes existed only in the minds of military thinkers.”

In summary, there are two arguments in favor of this possibility. The first is historical. New technologies, such as aircraft, despite having represented the insertion of a new geographical domain in war, did not change what Clausewitz (1984) understood as the nature of war. The second argument is theoretical. The precursors of air power theory, such as Douhet (2019), Mitchell (2009), or Trenchard (2008), as well as more recent theorists such as Warden (2000) or Deptula (2001), did not depart from the principles of war in conducting their analyses of how air power could draw on the consistent and preexisting theory around principles. This is not to say that they fully agreed with the more assertive conclusions of surface warfare theorists.

Douhet (2019), for example, was incisively contrary as to Clausewitz’s postulate (1984, p. 357) on the “advantages of defense over attack”. In *Il Dominio Dell’Aria* (The Domain of the Air), he assertively proposes that war in the air should excel in offense, stating that “Conquering the command of the air implies positive action-which is, offensive rather than defensive, action best suited to air power” (DOUHET, 2019).

Another example can be identified in the issue of mass, or concentration of effort. Fuller (1926), despite mentioning the air force in his work *The Foundations of the Science of War*, does not consider it a protagonist in the issue of effort concentration, elaborating this principle around the traditional quantitative issue. Deptula (2001), an experienced North American military aviator, considers that there has been a change in the principle of mass (concentration of effort) with the advent of aerospace power, especially with the low radar detection of *stealth* aircraft and the precision of aerial armaments. What this means is that the principles of war can be appreciated in the light of aerospace power and that they may eventually be interpreted differently.

Finally, still on the issue of methodological assumptions, we need to conceptualize our understanding of aerospace warfare. In essence, a military campaign can be conducted in phases, sequential or simultaneous, that denote a certain emphasis, either on a specific geographic domain or on the performance of a force itself. Thus, an air campaign can be a component of a military campaign, and aerospace warfare is part of warfare as a whole. The conflict in Ukraine has revealed that Russia progresses a campaign, however criticized, by seeking to integrate air and ground capabilities, however minor its success in this endeavor may have been.

When referring to aerospace warfare, or the use of aerospace power, we include in the considerations capabilities that make use of the third dimension as their main means of action. For this reason, we insert in the concept means whose space of maneuver in military operations is the aerospace domain (Earth’s atmosphere and outer space). Thus, manned or unmanned aircraft (fixed or rotary wing), ballistic, cruise or surface-to-air missiles, hypersonic missiles, and satellites, among other capabilities, regardless of whether they belong organically to the air force or to another armed force, will be included in the article’s considerations. The war in Ukraine has consistently demonstrated the participation of all these aerospace assets.

### 3 THEORETICAL FRAMEWORK

The theoretical framework for the interpretation of the principles of war in the conflict between Russia and Ukraine in 2022 will be based on two authors: the Swiss Jomini (1779-1869) as the main element of the framework, and, secondarily, the Prussian Carl von Clausewitz (1780-1831). Both have works that are often studied and quoted, respectively “A Summary of the Art of War”, from 1836, and “On War”, from 1832. The article, however, adopted lesser-known works by these authors, but which deal specifically with the issue of the principles of war. This choice is justified methodologically for two reasons. First, because of the focus that the authors give to principles, unlike the broader analyses of war in the more impactful works cited. The other motivation is to provide theoretical support in the classics, and not from doctrine manuals that enumerate certain principles without necessarily dealing with their origins and contextualization. This approach reinforces the demand to perceive the influence of pure theory in formulating doctrines.

These lesser-known works that we have cited have interesting points to make. In 1805, with translation into English in 1865, Jomini wrote the “Treatise on Great Military Operations: or a Criticism and Military History of the Wars of Frederick the Great. In Chapter XXXV of this work the author exposes his understanding of the “General Principles of the Art of War” (JOMINI, 1865). The main conclusions of the 1805 work would be superficially addressed in Jomini’s seminal work (“A Summary of the Art of War”). Although this work dates from 1832, the 1805 text (translated in 1865) is the one in which Jomini details his insights on the principles of war. Hence the reason we orient the reference to the first publication.

Clausewitz, in 1812, wrote “Principles of War” (CLAUSEWITZ, 2014), a set of recommendations to his tutee, Crown Prince Frederick William IV of Prussia. In this advice, he discusses issues associated with combat theory and strategy, always linking these discussions to what he understood to be principles to be observed. It is exactly on the ponderations of both authors that the analyses were derived.

A first consideration of the Swiss author is that “The principles [of war] are immutable; they are independent of the nature of the weapons employed, of time and places” (JOMINI, 1865).

Clausewitz (2014, p. 29), in the same direction, established in the critical study of military history the central point of his advice to the Prussian prince, warning that this study would make him “see things as they would be and as they would work [...], able to give those without experience a clear impression [of future facts].”

#### 3.1 Jomini’s Principles of War

Jomini (1865) synthesizes his knowledge in a great principle, or a fundamental principle, and from this postulate he deduces other linked principles. This is how he understands that “any military combination is based on operating with the greatest mass of our forces, in a combined effort, on a decisive point” (JOMINI, 1865, p. 448). In other words, the Swiss author understands that the entire logic of combat is to concentrate force on a certain point of the line of contact, in order to enable a quantitative differential in relation to the enemy’s forces.

From the concentration of force would arise other principles that Jomini understands to be forms of application of the fundamental principle. In large part, from these forms of application derive the principles of war in the way they are interpreted today in military manuals and doctrines.

A first derivation of the fundamental principle has been interpreted as the idea of offensive. Jomini (1865, p. 448) emphasizes that “the first step is to take the initiative in movements. The general who takes the initiative, knows what he has to do; he conceals his movement, surprises and overlaps in a part of the opposing lines.” The principle of the offensive would be directly associated with the idea of drive, energy, and protagonism of the commander in acting before the opponent.

A second principle derived from the fundamental idea is commonly associated with the principle of maneuver. On maneuver, he emphasizes that it is a matter of choice; of ability to ensure mobility of forces for movement to the point of concentration; and of knowledge about how to engage the opponent (JOMINI, 1865). Maneuver, therefore, is essential in the concentration of forces, for it is the maneuver that leads the mass of the armies to the selected point (where the opponent is weaker and the greatest advantage can be obtained), and enables the application of that force (through where, from where, in which direction and in which way the effort against the opponent will be concentrated).

From this successful concentration maneuver, Jomini (1865, p. 457) proposes that the general should know how to exploit the success of the attack, ensuring “the conditions for the beaten enemy to be neutralized in the sequence of operations. This proposition has been associated with the idea of exploiting success, that is, starting from an initial success, resulting from the application of massive force in the decisive point, the military force should persevere in the onslaught, seeking to neutralize and destroy the adversary in a definitive character, at least in the conception of battle, but also in war.

The concentration of effort on the decisive point leads Jomini (1865, p. 458) to consider about the “moral factor”. Many war theorists have identified morale as a decisive aspect or principle in fighting. The Swiss author, however, links the idea of morale to the concentration of force in the figure of the leaders, not necessarily in the soldiers.

The Swiss author cites that concentration can benefit if the military commander knows how to “induce the enemy to make mistakes” (JOMINI, 1865, p. 452). Implicit behind this idea is surprise. As a principle of war in the Jominian view, surprise is about getting the enemy to concentrate defensive force exactly where he will not be attacked.

Finally, Jomini (1865, p. 452) considers the issue of security, stating that “it is necessary to be constantly informed of the enemy’s positions and movements. The principle of security, as can be observed, establishes a direct relationship with the principle of surprise, since it is the negation of the latter. In other words, as the enemy’s maneuver device is known, security is strengthened and surprise is neutralized by the adversary’s actions.

Jomini (1865), consequently, contributes to the theoretical framework by pointing out the following principles for the analysis: a) concentration of force at the decisive point (also known as mass); b) offense, represented by taking the initiative; c) maneuver, which enables and applies the concentrated force; d) exploitation of the success resulting from the concentration; e) morale of the fraction commanders; f) surprise, by means of deception regarding the concentration; and g) security, a way to avoid surprise on the part of the enemy.

### 3.2 Clausewitz’s Principles of War

Coincidentally, Clausewitz (2014) comes to the same conclusion about what would be the main element of a theory of war, stating that it would be the attempt to

“discover how we can gain a preponderance of physical forces and material advantages at the decisive point” (p. 5). Now, it is a matter of concentrating the mass of forces in a place on the battlefield where it will be feasible to overcome the adversary quantitatively.

Clausewitz (2014), however, discusses principles with a different approach than the Swiss author. The said author deals with combat theory, strategy, and the application of principles. In combat theory, which he considers as different ways to engage the opponent, he defines some principles.

First, the Prussian author details the principles to be considered in a “battle with defensive posture” (CLAUSEWITZ, 2014). The military commander must “keep his forces hidden from the enemy,” establishing “reserves that can be in readiness” to be used at any time at any point in the defensive device (CLAUSEWITZ, 2014, p. 6). This demand generates the need for a “plan of maneuver that allows forces to be brought forward immediately.” This implies a posture of “non-passivity,” valuing offensive movements against “the largest fraction of the opponent.” (CLAUSEWITZ, 2014, p. 7-8). In this discourse, we can identify in the Clausewitzian proposition some principles of war: a) cover (or security); b) forces in reserve (readiness); c) maneuver; or d) initiative at the appropriate time (opportunity).

He also identifies general principles for the “offensive battle.” In it, he asserts the issue of mass at a decisive point as a vital element in battle. He supports the idea of “attack from the flanks, while containing the front of the enemy device,” valuing the “encirclement of the enemy,” which would lead to his “fragmentation and dispersion on the battlefield” (CLAUSEWITZ, 2014, p. 9-11). In this aspect, Clausewitz highlights the moral factor, which would be decisive when fractioning and dissipating the combat power of the adversary. Seeking the enemy’s point where the greatest advantage will be obtained demands “coordination and cooperation of the fractions toward this decisive point” (CLAUSEWITZ, 2014, p. 11). Finally, he highlights that in the offensive, the issue of surprise, “although difficult to be obtained”, can be decisive in concentrating the effort “in only one point” of vulnerability of the adversary line. We can also observe some principles in Clausewitz’s text: a) maneuver, with attack from the flanks; b) morale, aimed at fragmenting and dispersing the opponent; c) cooperation, by means of articulation of forces toward a common goal; and d) the surprise arising from the application of the central idea of concentration (CLAUSEWITZ, 2014, p. 11).

From these considerations, the main conclusion we can draw from the author regarding the application of the principles of war can be expressed in one of his inferences:

Never put all your forces into play at once and at random, thus losing all means of directing the battle; but tire the opponent, if possible, with few forces and conserve a mass for the critical moment. Once this decisive mass has been used, it must be employed with the greatest audacity (CLAUSEWITZ, 2014, p. 13).

With the theoretical inputs, the crucial question proposed in this article is to identify to what extent the principles of warfare can be observed in aerospace warfare, the object of this investigation. Certainly, these principles are reference points for analysis. Moreover, in professional military organizations, as the Russian Aerospace Force (VKS) and the Ukrainian Air Force (PSU) are supposed to be, the planning of operations and their execution are based on theoretical considerations, among which are the principles of war.

#### 4 AERO-SPACE WAR AND THE PRINCIPLES OF WAR

UA first observation about the war is that it is an unequal conflict, at least from a quantitative perspective. According to the world network sites *Global FirePower* (2022) and *Statista* (2022), specifically in the field of aerospace power, Russia is ranked 2nd, with about 4,000 combat aircraft, while Ukraine is 33rd, with about 300 combat aircraft. Moreover, Ukrainian equipment is of Soviet/Russian origin, from the 70s and 80s, and has not undergone upgrades or modernizations, as Russia has done with its fleet of aircraft.

This factor would, in theory, restrict VKS from applying the fundamental principle of concentration of force, as postulated by Jomini. However, what seems to be observed is just the opposite. VKS would not be fully employing its aerospace assets in the conflict (WHY HASN'T ..., 2022). In essence, the application of the principle of concentration of force in aerospace warfare would induce the employment of aerospace assets in achieving rapid effects, especially of a strategic nature, offensively, taking advantage of the opportunity to reach the opponent's center of gravity. In the analyses, however, what one would observe on the part of the VKS would be a posture antagonistic to the principle, giving rise to the interpretation that

it would be, in fact, cherishing the economy of forces or means, contrary to Jomini's premises, but consistent with Clausewitz when defending the defensive battle. In this case, the Russians would be dosing means in order to employ them in the restricted dimension, in function of the limited objectives, in the circumstances of concentrated space and time.

Still on the principle of concentration, also known as mass, one must consider that, in light of modern aerospace warfare, the classical view of the principle, focused on quantity, has been replaced by a view arising from the use of precision weapons, which generate effects without necessarily large quantities of weapons or aircraft (DEPTULA, 2001). This is perhaps an important update in the thinking of the classics, Jomini and Clausewitz, when it comes to applying them to aerospace power. From the standpoint of replacing quantity with effect, arising from precision weapons, it is not clear that such a principle has been exploited by the VKS. When it comes to one-off operations, especially helitransported ones, as in the case of the assault on the Hostomel airfield (RAHMAN, 2022), there is a predominance of the traditional mass view, associated with the quantity of aircraft (ALLYN, 2022).

The war in Ukraine may spark a debate around the concept of mass itself. Authors suggest the insertion of a layer called "air littoral" (BREMER; GRIECO, 2022a) in contrast to the concept of "Blue Sky", where high-performance interception aircraft and long-range surface-to-air missiles operate. In the air littoral, small drones (in large numbers) and MANPADS (*Man-portable air-defense system*) (in large concentrations) would revive the relevance of the mass concept in aerospace warfare. This upgrade would take place on the PSU side, using the concept of defense in vertical depth, characterized by layering, valuing different capabilities in an attempt to maintain sustained air operations. With massed drone and MANPADS levies, Ukraine would have been able to exert a kind of air denial (BREMER; GRIECO, 2022b) by the concentration of force.

According to the theorists analyzed the principle of exploitation consists of, from an initial success, progressing in action in the direction of seeking additional advantages against the enemy's situation. In view of the doctrinal stance of the VKS, this principle does not seem to have been considered. This is a slow progression on Ukrainian territory,

where the pace of surface force actions seems to set the tone in the military campaign (SKY NEWS, 2022). The VKS would be more focused on close support and interdiction of Ukrainian military assets than exploiting some strategic success in the air campaign (GONCHAROVA, 2022).

Another principle of great importance to Jomini and Clausewitz is that of maneuver, even when they associate it with the issue of speed. This principle is characterized by the ability to move forces effectively and quickly from one position to another, helping to gain superiority, build on the success achieved, and preserve freedom of action, as well as to reduce one's own vulnerabilities. It is not limited to the idea of geographic movement, but can be applied to the pace of a decision cycle. In the case of aerospace warfare it can be associated with the penetration capability of aircraft, the possibility of infiltration and airborne assaults behind the line of contact, for example.

Some facts point out that the principle of maneuvering does not seem to have been exploited by VKS (PEKAR, 2022). There is no evidence that movement in Ukrainian physical space acted as a significant variable. The VKS does not appear to have provided sufficient freedom of movement for the surface forces, nor is there evidence that it imposed a disadvantageous pace on the opponent's air operations (RITTER, 2022).

An interesting principle that Jomini and Clausewitz deal with is that of morale. In some cases, it is defined by the psychological impact that a series of factors (among them leadership) have on the conduct of the troops. The PSU exploited the "Ghost of Kiev" theme, supposedly seeking to boost the morale of the population (and its Air Force), which caused a widespread dissemination of the heroic image of the Ukrainian pilot, identified as Colonel Oleksander Oksanenko (SIMKO-BEDNARSKI, 2022). Praising the figure of the pilot, the news generated impact and, in theory, would have increased the PSU's resilience in the air, partly due to the use of innovative tactics and the dexterity of its pilots, such as very low altitude flights and the use of highways for landing and takeoff of combat aircraft.

These tactics and techniques used by PSU also highlight the application of the principle of surprise. Jomini pointed out that with surprise the opponent will concentrate his force where he will not be attacked and Clausewitz identified this point with where the enemy is vulnerable. So much for the

operation in whirlpools, supposedly a PSU capability since 2020 (UKRAINE AIR FORCE ..., 2020), such as low flying, may have surprised the enemy, shaking him psychologically, reducing his ability to react, acting where, how, or with forces that the enemy does not expect to face.

In the case of the principle of objective, the VKS could be facing a dilemma of purpose, since there is still no clarity about Russia's political objective in the conflict (KIRBY, 2022), which successively obscures the strategic and operational purposes of employment of aerospace power. Importantly, in military planning, the policy guideline that guides the employment of military forces establishes the objectives to be achieved, the desired end-state, and the limits of action of military power. The goal principle establishes the purpose of the campaign and how it should persevere. Both Jomini and Clausewitz associated the idea of concentration of force with the establishment of a purpose (political, in the case of the Prussian theorist) for the performance of military force.

Even when considering the Russian ground offensive, which at the time of writing this article was suffering a setback in the form of the Ukrainian counteroffensive, no overall purpose could be observed. There were initially three main axes in the invasion, which would point in the direction of the cities of Karkhov, Odessa, Lyiv, Kherson, Mariupol, and Kiev. Apparently, in the beginning of the Russian ground offensive, the idea of siege maneuver would predominate, clearly evidenced by the axes of the offensive (North>South; East>West; and South>North). However, and corroborating the idea of lack of clarity in the principle of the objective, the axes were suppressed, making room for actions in the Donbass region and near the Crimea. This had an impact on the actions of the VKS, including the suggestion that it "would be missing in the war" (BRONK, 2022b).

Transposing this perception to aerospace warfare we can analyze the principle of offense. In Jomini, this is a principle of great relevance, directly derived from the concentration of effort and related to taking initiative. Clausewitz highlights this principle when discussing the offensive battle. As noted, the offensive is intrinsically associated with the initiative of actions, immediately taking the fight to the enemy. There are some indications that the VKS sought the offensive in the early days of the campaign, as in the case of the attack on the Hostomel airfield (MITZER; OLIEMANS, 2022),

among other attacks, mainly missile attacks against Ukrainian air power (BRONK, 2022b). However, available assessments indicate that the VKS would have suffered a serious setback as a result of Ukrainian SAMs in the attack on that airfield. If reports are confirmed, 6 to 7 Russian helicopters would have been shot down, including 2 Ka-52s, and possibly an Il-76 transporting paratroopers (WILLIS; TIEFENTHÄLER; FROLIAK, 2022), most likely by the combined use of SAMs and other small arms.

Another possible analysis concerns the principle of security. Essentially, it consists in preserving the combat power of an air force, by means of measures that protect its human and material resources from enemy action. Therefore, this principle is often understood as the opposite of surprise. There is a hypothesis that the VKS would be preserving its aerospace assets, which leads us to think that the intrinsic vulnerability of aviation would be taken into account, with the greater purpose of preserving future capabilities than to inflict effects on the opponent (BRONK, 2022a).

On Ukraine's side, President Zelensky's demand for *No-Fly-Zone* would be a way to establish a heightened degree of aerospace control if deployed with Western military assistance (MALVEAUX, 2022). The *No-Fly-Zone*, essentially an airspace restricted to certain types of air operations and prohibitive to VKS, would extend the security of Ukrainian ground forces in the form of air cover provided by NATO countries.

On unity of command, Clausewitz discussed coordination and cooperation of forces, which highlights in the principle the assignment of command responsibility to only one person, ensuring that energies are directed toward established objectives. Based on the doctrinal issue and Russian historical experience there is no clarity about the application of this principle in the employment of air power. This has generated questions from the specialized media regarding the Russian inability to conduct complex air operations (BRONK, 2022a). In fact, with the recent incorporation of close support aviation into the VKS, previously subordinated

to the Russian army, there are suspicions that the operationalization of the principle of unity of command is still incipient, even within the VKS itself, and its ability to organize missions with various types of aerospace assets is limited.

## 5 CONCLUDING REMARKS

In June 2022, the war in Ukraine completed one hundred days, and at the time of writing this article, it seemed like an endless conflict. United Nations Secretary-General António Guterres warned that the war “threatens to unleash an unprecedented wave of famine and misery, leaving social and economic chaos in its wake” (UNITED NATIONS, 2022). The warning of an impending humanitarian tragedy follows the logic of all military conflicts and is very worrying indeed.

This article, while recognizing that all war is disastrous, has focused on analyzing one aspect of this conflict: the relationship of Jomini's and Clausewitz's principles of war to the way in which aerospace power is being employed by the VKS and PSU. Studies like this are essential for a better understanding of aerospace warfare. After all, as Jomini (1862, p. 34) said, “civilized governments must always be prepared for war at short notice, - let them never be unprepared.” Moreover, they can support analyses of their own demands, either under the focus of capabilities or in the consideration of hypotheses. So perceived Clausewitz (1984, p. 579) when he stated that “no one begins a war-or rather, no one in his full senses should do so-without first having clear in his mind what he intends to achieve and how he intends to conduct it.”

The principles of war are an important theoretical tool for conflict analysis. As stated by Chun (2004, p. 14) these principles “aid in understanding the application of military forces and the ways in which warfare is thought through the application of aerospace power.” Exactly this was the goal of the article in analyzing the War between Russia and Ukraine.



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