

On employing Air Power for the benefit of the Ground Force

Una visión del uso del Poder Aéreo en beneficio de la Fuerza Terrestre

Abstract: This study is a reflection on the application of Air Power in support of Ground Forces, addressing this combination's ability to guide modern combat and ensure success in war, given the flexibility of air assets. A qualitative, deductive and bibliographically based research method, supported by content analysis, was used to broaden the horizons set forth by Douhet, Mitchell, Seversky, and Warden, discussing the role of Army Aviation at the operational and tactical levels. The potential for organizational innovation is suggested, influencing the Ground Force's restructuring and managerial model. Finally, the study suggests that the notion of strictly strategic Air Power employment has been surpassed, considering the participation in recent fighting not only of Air Force air assets at the strategic level, but also of Ground Force air assets at the operational and tactical levels. It also demonstrates how Army Aviation is able to provide the necessary support to troops in the ground, enhancing Ground Force capabilities.

Keywords: Military Sciences. Military Operations. Air Strategy. Air Power. Military Aviation (Army).

Resumen: Se trata de una reflexión acerca de la aplicación del Poder Aéreo, en particular junto a la Fuerza Terrestre, abordando su capacidad para conducir combates modernos y la garantía de éxito en la guerra, debido a la flexibilidad de los medios aéreos. Con un sesgo cualitativo, el método de investigación utilizado fue deductivo y basado en la literatura, apoyado por el análisis de contenido, proponiendo una reflexión sobre el Poder Aéreo; esencialmente, se busca ampliar el horizonte sobre las propuestas de Douhet, Mitchell, Seversky y Warden, demostrando la acción de la Aviación del Ejército a nivel operacional y táctico. Se sugiere el potencial de innovación organizativa que influye en la reestructuración y en el modelo de negocio de la Fuerza Terrestre. Finalmente, el estudio sugiere una maduración en términos de empleo estrictamente estratégico, dada la participación no sólo de los medios aéreos de la Fuerza Aérea a nivel estratégico, sino también de la Fuerza Terrestre a nivel operativo y táctico, en los últimos combates, además de demostrar la capacidad de los medios de Aviación del Ejército de proporcionar el apoyo necesario a las tropas de superficie, reforzando de esta manera las capacidades de la Fuerza Terrestre.

Palabras clave: Ciencias Militares. Operaciones militares. Estrategia Aérea. Poder Aéreo. Aviación Militar (Ejército).

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1 Introduction

The use of air assets in support of military operations dates back to World War I, with the integration of air vectors into conflicts and the development of a sophisticated conceptual and doctrinal framework.

The scientific-literature origins of the use of the airspace for military purposes are also in World War I, the time of works such as *The Command of the Air*, by Giulio Douhet (1927) and *Victory Through Air Power*, by Alexander Seversky (1942). This tradition continued with Billy Mitchell, Trenchard, Boyd, Warden, Pipe, and Meilinger, among others, and was consolidated in the creation of a specific locus of study, whose basic propositions are underpinned by these thinkers' views – Air Power Theory.

Accelerated by the outbreak of the First World War, air power emerged as an important element of military power virtually as soon as aviation itself came to be. The evolution of Air Power continued throughout the 1990s, driven by innovation in science and technology, such as aerodynamics, metallurgy, propulsion, communication, electronics, among others. This occurred mainly due to the increased security concerns of the world's major powers (GRAY, 2009). As such, Air Power is the synergistic application of air, space, and information systems to project a country's global strategic military power (UNITED STATES, 2011).

In World War I's static clashes, victory was gained by controlling the battlefield with linearly distributed forces. People far from combat areas hardly felt threatened, since the conquest of territories by the enemy would have required one's defensive lines to be broken. With Air Power's increasing importance, war made inroads into national territory (COOLING, 1993), transforming air operations into an effective support element (WELLS, 2009), imposing a new operational rhythm, and threatening countries' security (MUELLER, 2010).

In view of the evolution of combat in air space, there have been numerous attempts to update Air Power's postulates. However, technological advances usually pay no heed to theoretical debates. In World War II, for instance, attempts to implement Douhet's (1927) and Mitchell's (JONES, 2004) ideas about strategic bombing were foiled by the inaccuracy of the available bombs (COHEN, 1993). In the Vietnam War, precision was achieved with laser-guided bombs, but the lack of a coherent plan once again frustrated the implementation of theories (THOMPSON, 2010; UNITED STATES, 1992). As a matter of fact, the Gulf War set the stage for the first technologically informed and rationally planned use of Air Power (UNITED STATES, 1992). In all Gulf War clashes, aircraft proved themselves as relevant instruments.

Since the twentieth century, parallel to the revolution of Air Power instruments – defined by the frequent use of ballistic and cruise missiles, information systems and precision munitions – opponents have made a point of investing in new techniques and tactics, avoiding the massification of forces and instead often opting for selective and fast attacks. Conflict analysis has progressively contributed to preparation against these new techniques and tactics. One of its observations concerns the fact that Army Aviation Units are more relevant for operations in confined, reconnaissance and security environments, rather than deep attacks (JOHNSON, 2006).

The flexibility of Army Aviation Units enables them to be used at several levels, from the strategic to the tactical. This contradicts the very foundations of Douhet's (1927) and Mitchell's

(JONES, 2004) theories, since they stand for the idea of an independent air power. This article discusses the potential contributions of Air Power to the Ground Forces (GFs)¹, at the operational and tactical level. This discussion occurs against the background of Air Power Theory's basic propositions, as Meilinger (1995) formulates them.

In addition, this debate focuses on the use of the Ground Force's organic air assets, verifying its power-projecting capabilities to achieve operational and tactical objectives via helicopter exploration of airspace. Other perspectives for the use of Air Power are admitted, although they are placed within the same frame of reference. Our discussion aims to contribute to the strengthening of Defense perspectives and to the consolidation of Military Sciences, while providing a conceptual framework for the debate on the roles of Air Power.

This text has four sections, including this introduction. In the second section, we present a discussion on the strategic use of Air Power – encompassing strategic employment, effect-based operations and the comprehensive approach – either confronting or corroborating Meilinger's propositions. In the third section, following the same line of thought as before, the concepts of offensive capability and parallel war are discussed. In the fourth and final section, we present perspectives on the use of air assets alongside GFs.

2 Methodological referential

Methodologically, the text is structured as a qualitative research, seeking new teachings and knowledge based on different points of view. Its goal is to contribute another view on the subject, not quantify the facts. The purpose of the information collected here is to deepen and elucidate knowledge, working with a universe of meanings that is not limited to numerical variables (MINAYO, 2001).

This research is a bibliographical review of previously analyzed theoretical references. It investigates and confronts the questions in our purview, using Meilinger's propositions as a main point of reference (1995). By combining different perspectives with these propositions, we are able to better understand the evolution in the use of Air Power at different geostrategic instances, particularly at the operational and tactical levels, where it may subsidize the organization of networks and alliances (PARIS, 2004). Beyond the definition of a methodology, this analysis has been based on a detailed plan. Its entire design is premised on a dense theory, which validates this work (DEACON, 2012).

A fair investigation is attained by a systemic and complementary examination of all sources, opposing opinions, building new perspectives without seeking to close the discussion, and making the investigative process transparent. Examples are the use of articles published by the *Air & Space Power Journal* and *The United States Army War College*, which show the views of the Air Force and the US Army, respectively, regarding the use of Air Power at different geopolitical levels.

¹ Brazilian Army instrument of action for Broad Spectrum Operations; includes all elements organized according to capability-based combat modules (BRAZIL, 2014).

In this context, be it in the national community or the international community, the Air Force and the Army (particularly Army Aviation) have divergent perspectives regarding the geopolitical use of Air Power. Thus, this study presents a reflection on the battlefield's 3rd dimension from the perspective of the Ground Force, particularly considering the use of helicopters.

Given the abovementioned divergence, data collection was deepened via the selection and analytical reading of sources. After this process, our observations were consolidated, with the relevant points being confronted. This contributed to the identification of more works, which were then considered for inclusion or exclusion in order to gather more perspectives on the combined use of air assets and Ground Forces. The research was conducted in the journals listed in Chart 1, and spanned from January 4 to June 30, 2017. The literature review included articles and magazines dealing with Air Power. The language used for research on international websites was mainly English, due to the limited collection of publications in the Portuguese language.

Chart 1 – Details of terms mapping in the literature.

Database	Search strings
<p><i>Google Academic</i> <i>Scientific Electronic Library</i> <i>SciELO</i> <i>Science Direct</i> <i>CAPES</i> <i>SAGE journals</i> <i>Routledge</i> <i>Fundação Getúlio Vargas</i> <i>RAND Corporation</i> <i>OTAN</i> <i>Defense Technical Information Center</i> <i>Military Operations Research Society</i> <i>U. S. Army Training and Doctrine Command / Combined Arms</i> <i>Center Repository / Heritage and Education Center</i> <i>The United States Army War College</i> <i>Military Operations Research Society</i> <i>Air & Space Power Journal</i></p>	<p><i>Strategy</i> <i>Violence</i> <i>Aviation Battalion</i> <i>Effect-based operations</i> <i>Comprehensive Approach</i> <i>Close combat</i> <i>Parallel operations</i> <i>Gulf War</i> <i>Korean War</i> <i>Vietnam War</i> <i>Afghan War</i> <i>Air Power</i></p>

Source: Author (2017).

The research considered works published since World War I (WWI) in chronological order. Since a complete historical survey of Air Power was not feasible, the experiences of the Gulf War and the Afghanistan War were our main focus. Other criteria were: language (Portuguese/English/Spanish), types of documents (original article/review), area of knowledge (strategy), and geopolitical space (given our focus on the experiences of NATO countries and their partners). We identified 133 articles, a vast production on the application of air assets and its doctrine. Most were published in the English language.

As for military theories, it is worth noting that Air Power theory and science are based on universal concepts aimed at controlling uncertainties. Science provides knowledge with a linguistic basis, translating it into conceptual perspectives and schematics. Military theory precludes improvement exclusively by means of tests in a controlled space, or via doctrine and technology alone. Thus, knowledge obtained from the experience of war is of the utmost importance. In this sense, science provides military theory with a methodology for the analysis of interdisciplinary phenomena and experiences, creating a framework of new analytical conceptions, which are widely used in this research (BOUSQUET, 2009).

3 Air Power: from the strategic level to assets' integration at every level

The strictly strategic use of Air Power is one of the main propositions of the theory's proponents. In WWI, the use of air assets progressed along a doctrine defined by deep target engagement, dissociated from terrain as a factor (JONES, 2004). These targets were regarded as centers of gravity (CoG). Hitting a CoG target would reduce or even entirely disrupt the enemy's combat possibilities (VAN CREVELD, 2011). The CoG could be a logistic structure, a command-and-control system (C2), an industrial complex, or even the enemy population itself (METS, 1999).

Some episodes in modern history have clearly been made possible by the idea of strategic Air Power employment. One such example in Normandy (1944), where the Allies blocked reinforcements and attacked the German Army's weaknesses by means of aerial bombings, disrupting the logistic system of German armored forces (WARDEN III, 1998). In the Gulf War (1991), Coalition Forces identified the enemy's C2 system, the Iraqi leaders and weapons of mass destruction as CoG targets (UNITED STATES, 1992). These targets were attacked using guided missiles connected to the global positioning system.

However, over time, the strictly strategic employment of Air Power advocated by Douhet and Mitchell has been considerably criticized. According to these criticisms, such thinking would be merely intended to garner budgetary resources and prominence in national security debates, in order to maintain the investment flow for air bombardment development – after all, critics say, the country's bombing doctrine has not changed since WWII (GRAY, 2009).

Based on the Gulf War's lessons, the US Armed Forces' doctrine of strategic Air Power employment underwent a reformulation (sometimes called a "Revolution in Military Affairs") (JOHNSON, 2006; MCMASTER, 2008), particularly in the US Air Force (USAF). One of the most important changes concerned the way attacks were modeled according to their effects, so as to shape the adversary's behavior (KELLY; KILCULLEN, 2006) without engaging definitively. This led to the concept of effects-based operations (EBO) (SMITH-WINDSOR, 2008).

The central tenet of EBO is the integration of military and civilian² assets in favor of the Desired End-State (THUVE, 2006), whether at the tactical, operational or strategic

² Military assets include not only Air Force, but also Army and Navy fire and aviation assets. Civilian assets can range from political actions to economic sanctions on the enemy.

level (MEILINGER, 1998). This amounts to a dissociation between assets employed at the geostrategic level. In the Gulf, the Coalition Forces used Air Force direct attack aircraft, long-range ground systems such as the Tactical Missile System (ATACMS), and US Army attack helicopters against the Iraqi air defense system, rendering Iraq virtually defenseless (MURRAY, 2002). However, the bombing theory underlying these operations was that of the WWII (GRAY, 2009).

In this context, air interdiction³ was structured as an effective instrument against CoG targets, integrating Air Force and Ground Force assets in deep operations (WINTON, 1996). In Operation Desert Storm (1991), Task Force Normandy – the US Army Aviation Regiment helicopter task force – attacked Iraqi radar sites, paving the way for the taking of Baghdad. Subsequently, the Task Force began Close Combat Attacks (CCA) to consolidate operational and tactical objectives, enabling the battlefield to be quickly and flexibly shaped (UNITED STATES, 2007).

In Afghanistan (2001), attacks on insurgents employed US Air Force B-52 aircraft. Symbols of superior air power, the B-52s were deployed in deep attacks to support Northern Alliance tactical actions (LAMBETH, 2006). These attacks were a departure from conventional doctrine, since the enemy consisted of small scattered groups, hidden in caves and with portable weaponry, making it difficult to distinguish close areas from deep areas (BARAN, 2015). In these conditions, avoiding friendly fire required a high level of training (UNITED STATES, 2007). A workaround to this problem was the use of unmanned aerial vehicles (UAVs) for real-time information gathering (THORNBURG, 2009).

Thus, actions by the Ground Force's Task Force of helicopter and unmanned aerial vehicles proved effective at the operational and tactical level during the Gulf War (1991) and during the Afghanistan War (2001). From these experiences, the US Army was able to identify other opportunities to improve organic air assets in order to overcome the identified obstacles, especially in regards to strategic transport for the concentration of forces in the theater of operations (LILES; BOLKCOM, 2004).

Training-wise, the US Army saw improvements in CCA operations by training helicopter pilots under conditions that reflected the hot, high-altitude urban and desert environment found in Afghanistan and Iraq. This contributed to crew confidence, security and situational awareness (LILES; BOLKCOM, 2004).

Another important point was the integration of fixed-wing attack aircraft with artillery and Army helicopters, especially Apaches (AH-64). Such integration proved effective against close threats, as in the 101st Airborne Division's raid on the city of Karbala, Iraq, in 2003 (KUGLER, 2007).

This situation reinforced the argument that jointly employed heterogeneous assets facilitate the attainment of the intended effects, and that success is not just about target or weapon choice, but rather about military behavior (GRAY, 2009). Moreover, such success is also a reflection of the alignment

3 Pre-combat neutralization of forces, maintaining freedom of action (UNITED STATES, 2007).

of strategic objectives with the intended tasks and outcomes, coupled with an efficient decision-making process (GRAY, 1999) able to extrapolate the enemy's weaknesses (VICENTE, 2008).

Nevertheless, the inaccuracy of the metrics used in effects assessment, especially in actions with psychological or cognitive effects, and the methods used in asset integration led to criticisms against EBO (MATTIS, 2008). An example of this inaccuracy occurred in Operation Tora Bora, in Afghanistan (2001), where the analysis of the information system (essentially in regards to means of surveillance) was unable to compensate for the insufficient amount of forces guarding the exfiltration routes (BIDDLE, 2005).

A similar situation occurred in Operation Anaconda (2002), this time in respect to the assessment of the devices, armament and numerical strength of Taliban and Al Qaeda fighters in the Shah-i-Kot Valley (KUGLER, 2007). The less-than-dominant knowledge of the area of operations demonstrated that combat and intelligence means alone are not enough to overcome uncertainties.

Another problem faced by EBOs was personnel inexperience in conducting joint operations to support civilian populations, particularly in urban environments, restricting the attainment of pre-established objectives (SCOTT, 2017). Commanders and Chiefs-of-Staff analyzed the operational environment in order to assess the effects, without, however, expanding this assessment beyond the geographical dimensions of the battlefield – i.e., towards the political, economic and informational expressions of human behavior (VEGO, 2006).

Despite propitiating some doctrinal advances, particularly in joint action among different air assets, EBOs have definite flaws, especially in their understanding of the operating environment's culture, inter-agency integration, mission analysis, and periodic ratification or rectification of plans (MATTIS, 2008), becoming demonstrably inefficient in the face of changing or volatile information.

In modern combat, battlefields have lost all of their former rigidity and moved on to a paradigm marked by undefined fronts and scattered adversaries. Operations have become a part of the larger societal problem in situations of civil unrest, famine and epidemics, thus contributing to human degradation. This degradation is a barrier to the reconstruction of peace and stability, and it is thus necessary to gain the trust of local leaders and to legitimize military actions under the lens of the international media. In this sense, one must have flexibility, merging different tasks and proactively promoting inter-actor cooperation (COLÓN, 2011).

War has become increasingly irreducible. The tendency towards the uncontrollable leads to a balancing act between ends, means and costs, even while the rational overflows into an irrational, chaotic, and violent conflict (CLAUSEWITZ, 1976). Thus, the need for a doctrinal basis defined by collaborative, information-sharing principles has motivated the development of the Comprehensive Approach. Joint operations⁴ have become a significant object of investment, marked by a sharp awareness of the nature of problems and the purpose of actions, so as to generate stable resources in an environment of uncertainty and chaos. In this context, the integrative management of military and civilian efforts has enabled a view in which success is not found solely in the use of military power, but in integrating different fields of power in favor of representativeness (COLÓN, 2011).

⁴ Joint Operations are characterized by the use of assets from more than one Singular Force, under a single command (BRAZIL, 2011).

In this new doctrinal conjuncture, civilian-military integration proposes a better adaptation to threats and public opinion, as these threats are organized in amorphous and interconnected networks. Meanwhile, coordination and joint management of skills enable rationality and systematization in the application of force and in the assessment of possibilities and challenges of multidimensional and dynamic environments – such as Iraq and Afghanistan (HOFFMAN, 2007). To this end, information operations have grown in magnitude to enable a superiority of knowledge about the operating environment (JOHNSON, 2006).

Some Armed Forces have incorporated participatory behaviors involving goals and tasks, connecting different systems with flexible protocols and goal assessments, and integrating information and logistics networks in favor of changes in military culture, refuting the monolithic character of the operational and organizational systems proposed by Warden III (1998) and Meilinger (1995). This paradigm shift has led to increased situational awareness and joint cooperation in regular stabilization and reconstruction operations – as seen in Afghanistan (2001) – overcoming inter-personnel challenges and the complexity of the inter-agency environment.

Thus, the incorporation of a participatory behavior has resulted in significant changes of organizational structure. These changes required an evolution of the various Armed Forces subsystems. An example is the restructuring of US Army Aviation, particularly during the Afghanistan War (2001), made possible by the adoption of modular, adaptable and agile brigades defined by sustainability and smaller structures – the Multi-Functional Aviation Brigades (MFAB). These modular brigades were able to successfully carry out a number of attack, defense and stabilization missions. In this sense, they acted as force multipliers, qualified for broad spectrum operations (BARAN, 2015). Thus, an even deeper integration of Air Units with UAVs – now equipped with accurate munitions, and able to isolate and destroy enemy forces – was made possible (SCOTT, 2017).

These changes went beyond the Armed Forces' conceptual and structural basis, also affecting the equipment involved in combat operations, allowing for more efficient action and offensive capability. Modifications made to US Army attack helicopters (essentially AH-64 aircraft) during the Afghanistan (2001) campaign are one example. The helicopters were retrofitted with Aircraft Survivability Equipment (ASE) such as electronic countermeasure systems and radar warning and missile alert systems, enabling them to provide better troop support. However, these countermeasures proved ineffective against the weapons used by insurgents, emphasizing how virtual simulation is required for training specific maneuvers, as proficiency in performing these maneuvers increases survivability in hostile environments (KELLEY, 2013).

For these new structures and combat assets to be successful, more flexible leaders had to be trained, able to respond quickly by means of integrated air-to-ground maneuvers at the operational and tactical levels. To this end, adjustments in the training process were carried out – such as the inclusion of simulators – so technical and tactical skills could be maintained, increasing the proficiency of leaders (CURRAN, 2001).

In any case, Air Power strategy has evolved significantly, enabling greater integration between air assets at the strategic, operational and tactical levels, in contrast to Meilinger's (1995) proposition

and Douhet's (1927) idea of strictly strategic employment. This is due to the increased complexity of the operating environment and the integration of military and civilian assets not only for the benefit of the Joint Command, but also to allow for the realization of the Comprehensive Approach.

However, the principle of strategic Air Power employment remains relevant to the achievement and maintenance of local air superiority, as the air-controlling force will potentially have control of the battlefield (DOUHET, 1927), establishing a relationship between air security and surface operations.

Finally, the integration and coordination of air and ground assets has become essential to achieving end goals in the complex environment of modern fighting, alleviating and controlling collateral effects.

4 Concurrency of actions: an effort-multiplying factor

Air Power's offensive vocation and ability to multiply efforts (MEILINGER, 1995) strengthen the possibility of action at all battlefield levels, whether strategic, operational or tactical. Since the Contemporary Age, the Art of War has solidified the central tenets of troop command. In the early nineteenth century, strategy was applied in a logical way to overcome the enemy, flexibly making use of violence to obtain the desired end goals (COUTAU-BÉGARIE, 2010).

Flexibility in the use of Air Power violence is explored in the concept of Parallel Operations (PO), which results from the aeromobility of assets carrying out actions characterized by simultaneous amplitude and depth, across different points on the battlefield (SEVERSKY, 1988). This mitigates operational risks and creates conditions of inadequacy for enemy forces, decreasing the likelihood of reaction and ensuring enemies lose their situational awareness (UNITED STATES, 1993).

Within Parallel Operations, understanding the opponent's devices and possibilities, coupled with robust action – employing the element of surprise as well as physical and psychological shock – are necessary requirements for the degradation of opposing forces through joint action on the dimensions of time, space and at the geostrategic level (DEPTULA, 2001a).

During the first Gulf War, these dimensions were characterized in a particular way. In the time dimension, success meant the ability to engage 50 targets in the initial 90 minutes of combat; in the space dimension, it regarded the ability to act in both amplitude and depth, neutralizing the various critical defense systems; and in the geostrategic level, it referred to the simultaneity of actions at the tactical, operational and strategic instances, in order to precipitate the enemy's collapse (DEPTULA, 2001b).

Another relevant aspect of Parallel Operations is the targeting process. The correct selection of the opponent's vital points (VAN CREVELD, 2011), restricting its ability to repair and adapt to the situation, enables a cost-effective use of assets by friendly forces. This leads the enemy to lose its willingness to fight, without causing total annihilation (WARDEN III, 1998). According to Clausewitz (1976), a successive use of forces causes the outcome of the combat to be postponed, whereas a simultaneous use of forces almost always anticipates it to the beginning, although such an anticipated outcome is not necessarily definitive.

Exemplifying such a situation of simultaneous use of forces, Meilinger (1995) speaks of the British Forces' bombing of German industrial parks while, at the same time, US Forces fought the Luftwaffe for the conquest of air superiority in World War II and other aircraft hunted submarines, blocking the passage of reinforcements to Rommel in North Africa during the Battle of the Atlantic. This made it difficult for German forces to resume operations. Despite the various actions taken during WWII, the principles of Parallel Operations were not fully explored because the desired air superiority was never obtained, allowing German forces to recover. This delayed the planned outcome of systemic enemy paralysis (SPANGRUD, 1987).

During the first Gulf War (1991), the US air campaign plan foresaw four sets of targets whose neutralization would progressively cause the isolation of Iraqi leaders, the conquest of local air superiority, the neutralization of weapons of mass destruction, the reduction of enemy offensive capability and, finally, the isolation of Iraqi troops in Kuwait (UNITED STATES, 1992). This was a clear demonstration of how the targeting process had been refined.

In the first two days of combat, numerous aircraft engaged different types of targets with synergy and synchronization, leading to an anticipated outcome. Assets such as Air Force laser-guided bombs, air-to-ground missiles, Army helicopters, and US Navy Tomahawk missiles were employed (UNITED STATES, 1992). Although this concerted initiative failed to eliminate enemy reaction (DEPTULA, 2001b), it was successful in severely limiting the enemy's movement and ability to resupply, reorganize defenses and organize counterattacks (WARDEN III, 1995, 1998).

Lessons learned from this experience made it possible for two new goals to be set in order to consolidate Parallel Operations during the First Gulf War (1991): the conquest of strictly local air superiority in an air-to-air operation at the behest of the Air Force, and the suppression of enemy air defense by the integration and coordination of Air Force, Army and Navy assets, thereby building the parallel action of the different combat forces. Thus, Army offensive aircraft and Air Force bombings were deployed within a tactical-strategic continuum involving attacks against various types of targets.

In addition to the targeting process, airborne aeromobility directly benefits Parallel Operations, enabling the transposition of obstacles such as rivers and valleys, and subjecting the enemy to multiple strikes (DOUHET, 1927). This amounts to an ability to attack at different geostrategic levels, materializing the notion of ideal war evoked by Clausewitz (1976). Moreover, aeromobility makes it possible to maneuver with speed and agility, positioning and repositioning forces, which integrates air and ground maneuvers and provides operational and tactical advantages, allowing for timely maneuvers and early warning of enemy movements (UNITED STATES, 2014).

In addition to aeromobility, the increase in radar signature reduction (stealth) and the accuracy of laser-guided munitions provide even more advantages and combat power to air assets, greatly enhancing their covert operability (DEPTULA, 2001a). In the Gulf War (1991), munitions had an accuracy error of less than 10 ft (COHEN, 1993, thanks to laser guidance. In contrast, despite the qualified and skillful crews, WWII bombing operations often fell short of their goals, as only about 20% of the bombs landed within about 1,000 ft of the designated targets (SPANGRUD, 1987).

However, in the Afghan War, engagement between aircraft and Al Qaeda fighters occurred close to ground troops, compromising the air support provided by fixed-wing aircraft due to the high altitudes and restrictions imposed by the US Air Force (given the risk of friendly fire). In this context, Army AH-64 helicopters became critical for close fire support. In addition, the increased lethality and accuracy of new munitions such as the Low Cost Precision Kill (LCPK) rocket ensured better control of collateral damage, as well as efficiency against infantry combatants and light armored vehicles (WIGGINS, 2003). Similarly, the CH-47 and MH-47 transport helicopters were proven flexible in repositioning troops due to their significant power and internal carrying capacity (JOHNSON, 2006).

Besides the use of the Aviation Battalions, another contribution to the success of Parallel Operations was the implementation of the BAE (Brigade Aviation Element). These elements allowed better integration, coordination and synchronization between the planning and execution of Army Aviation Battalion maneuvers, promoting a more adequate close fire support and, above all, avoiding friendly fire (MCMASTER, 2008). They also influenced the evolution and modernization of doctrine, training and equipment (KUGLER, 2007; LAW, 2012).

As a result, targeting capabilities, aeromobility, new technologies, and linkage elements insertion, coupled with flexibility in the Air Power's use of violence, strengthened Parallel Operations, destabilizing the power balance and causing the enemy to shutdown in a shorter amount of time, as well as reducing the friendly force's wear and risks.

The lessons learned from the Gulf Wars and Afghanistan show that Army Aviation assets are contributing to enhancing Ground Force and Joint Command capabilities. Armed reconnaissance, security operations, air combat, deep attacks and medical evacuation are some of the ways aviation has been able to promote a greater preservation of combat power.

The concept of Parallel Operations, along with the principle of airborne offense, is also useful in maintaining allied forces' initiative, freedom of action and a genuine situational awareness, controlling collateral damage, bringing the war to the enemy, and making counterattacks unfeasible. This was seen in Iraq and Afghanistan.

5 Final considerations

Air Power's integration with Ground Forces is ever increasing. This is becoming evident in broad spectrum operations, in which such integration enhances the capabilities of Ground Forces, mainly due to the flexibility allowed by air assets. Allied action in the Gulf Wars and Afghanistan are clear examples of such flexibility. In addition, the minimization of risks and reduction of the resources and time used for reaching the desired objectives leads to a reduction in operating costs.

This article discussed Meilinger's (1995) propositions about Air Power: Air Power has to be employed in a strictly strategic manner; Parallel Operations can be carried out at all

levels of war; and Air Power is a primarily offensive weapon. We have also demonstrated that Air Power Theory can be used to strengthen the operating capabilities of ground assets, especially ground troops.

The first proposition was broadly rebutted by the advent of the Comprehensive Approach. Such a rebuttal is a clear example of doctrinal evolution. The latest major conflicts, such as the Gulf War and Afghanistan, show that the central tenet of Air Power as a strictly strategic resource has matured, considering the recent application of air assets belonging not only to the Air Force, but also to the Ground Forces, at the operational and tactical levels. Examples are Operation Anaconda (2002) and the incursion into Karbala (2003).

The propositions regarding Air Power's offensive character and the possibility of Parallel Operations at all levels of war corroborate the notion that flexibility and aeromobility are essential traits of Army Aviation assets, allowing them to provide the necessary support to surface troops, especially at the operational and tactical levels.

A reflection on these three propositions shows that flexibility and offensiveness of air assets make it possible for them to be employed at the operational and tactical levels, and not only at the strategic level. Moreover, the roster of Army Aviation aggregate capabilities may include the possibility of conducting close fire support to the Ground Force, with the interdependent use of dominant maneuvers, precise engagement, and the integration of aircraft and unmanned aerial vehicle systems.

As the focus and challenges of the operating environment continue to evolve, changes in the global geopolitical scenario have led to a reevaluation of projected national security risks, forcing the Armed Forces to adapt so they can keep attaining National Defense Strategy (BRASIL, 2012) objectives concerning the preservation of the sovereignty and integrity of the national territory.

To this end, the clarification of national defense guidelines is important – so that people who diverge or are confused can conceive of a more effective and strategic view of the use of Air Power alongside Ground Forces. The necessary sacrifices may lead to the consolidation of a fighting power superior to the current one, allowing us to prepare for an uncertain future.

Doctrinal evolution regarding the strategic use of Air Power sets new perspectives for flexibility in the use of air assets, not only at the strategic level but also at the operational and tactical levels, enhancing existing skills and making it possible to set a new operative pace to military conflict, with the transposition of natural obstacles and the optimization of time.

This evolution also emphasizes integration and cooperation between the military and civilian segments, increasing situational awareness and maintaining a constant re-validation of actions in order to reduce collateral damage, especially to the population. Moreover, this integration and control facilitate the maintenance of public opinion support for military operations, according to the precepts of the Comprehensive Approach.

Army Aviation Battalions can perform innumerable actions in both amplitude and depth, leading the enemy towards irreversible wear as a result of the division of forces in an attempt to mitigate damage to sensitive points. Combined with the Parallel Operations *modus*

operandi, these actions strengthen existing capabilities and enable precise attacks on the enemy's defensive system, solidifying offensive actions, reducing Ground Force wear, and enhancing military operations' ability to adapt to complex environments.

A translation of this analysis to the reality of the Brazilian Army shows that the inclusion of air assets in the Ground Force structure can lead to significant doctrinal improvements, contributing to the building of asset interoperability. Such an interoperability requires further doctrinal evolution within the Armed Forces, especially in respect to Joint Operations and inter-agency relations. There must be cooperation and integration between civilian and military capabilities in favor of building a unified planning, regardless of operational level, in opposition to the parochialism of each Force or Agency.

The integration of rotary-wing aircraft and unmanned aerial vehicles (UAVs) has provided for further doctrinal evolution, promoting synergy between combat assets, with helicopters performing close reconnaissance, attacks and close combat, and UAVs enabling real-time situational awareness of the area of operations. Meanwhile, reliable digital communication systems help provide air support to troops in the ground (UNITED STATES, 2017), as well as flexibility against threats.

Besides doctrinal improvement, technological innovation is also a factor in the transformation of the Armed Forces. The incorporation of new technologies leads to organizational renewal, requiring the implementation of training in virtual environments in order to overcome existing technical and tactical deficiencies, as shown by Afghanistan (KELLEY, 2013).

Finally, the lessons learned in the latest conflicts demonstrate the need for the integration of expressions of power, treating military power as more than a means for achieving political goals. These lessons corroborate the necessity of interoperability of military and civilian capabilities in the broad-spectrum environment characteristic of the 21st century. Thus, deepening the use of Air Power Theory within the Army will help both the Ground Force and the Joint Command attain their desired objectives.

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