

# The Influence of Airpower Architects on Structuring the Air Forces

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## Introduction

The theory of airpower was born before the First World War (WWI), the scenario for its first great application; with Giulio Douhet, Billy Mitchell, and Hugh Trenchard being cited among its best-known theorists. All of them, in one way or another, faced much opposition to their ideas, mainly because they anticipated the application of the new war machine that had emerged: the airplane.

However, David MacIsaac<sup>1</sup> argues that the term airpower would have to find a clearly defined, or at least irrefutable, place in the history of military or strategic theory. He states that the influence of theorists has been limited because, in their field of application, the effects of technology and the exploits of agents have had a greater role than ideas. MacIsaac<sup>2</sup> points out that “the use of the airplane was a specific result of the choice of each nation . . . reflecting an effort to integrate the peculiar possibilities of the aircraft in support of ground or naval forces, or in independent operations . . . for the achievement of national objectives.”

Therefore, the problem on which this brief investigation focuses is pinpointing the degree of influence of airpower theorists—highlighting Douhet, Mitchell, and Trenchard—in the structuring and operational organization of air forces, with emphasis on the period from 1910 to 1950 and the focus on the air forces of Brazil, Italy, the US, the United Kingdom, and Germany.

As a theoretical framework, the analyses of Edward Warner and David MacIsaac on the theories of Douhet, Mitchell, and Trenchard were used. Warner observes that Douhet’s theory reflects the geographical position of Italy and that it would have minimized the possibility of the existence of a battleplane to prevent attacks by bombers, a central point of Douhet’s theory to achieve air dominance.<sup>3</sup> This article investigates a relatively unexplored field. Normally, studies cover the basic points of each theorist’s thesis on airpower—that is, employment on the battlefield and the technology involved. However, the connections between the organization of an Air Force and the respective theories of airpower are usually not addressed.

The article examines the period between 1910 and 1950, since this period encapsulates when practically all air forces consolidated as organizations; and is divided into two sections. The first is a brief analysis of each theorist’s organiza-

tional and operational vision of the air force in their respective countries, against the backdrop of the principles envisioned by those theorists. The second briefly recounts the evolution of the organization of air forces in the US, the United Kingdom, Italy, Germany, and Brazil, and the influence of each theorist's vision. This section also contains, in summary form, an analysis of Italian theorist Giulio Douhet's thoughts regarding the creation and organization of the Ministry of Aeronautics and the Brazilian Air Force (FAB). The conclusion brings the results of the research and a comparative approach between the ideas of the studied authors.

## **Airpower Theory**

### ***Initial Considerations***

This section's objective is to highlight the main points of airpower theorists' vision that may have influenced how air forces were structured from 1910 to 1950. The chosen period encompasses the advent of aviation, the two World Wars and their results—highlighting the independence of aviation from the other armed forces.

### ***The Principles Envisaged by Douhet, Mitchell, and Trenchard***

In Dik Daso's vision,<sup>4</sup> the history of the evolution of airpower was more than just the combat aircraft used in war. In his opinion, airpower characterizes a technological system, as it represents the unification of an instrument and a function and, in short, has a greater implication than just a power-driven airplane. Daso mentions that Holley<sup>5</sup> also highlights that aviation learned an important lesson "on the organization for decision in a unified command" to replace the dispersed, poorly organized, and overlapping chains of command that existed during WWI.

Douhet, Mitchell, and Trenchard saw this as a basic principle defining the independence of aviation from the other armed forces—that is, the creation of an air force as an armed force with the same status as land and naval forces. Douhet and Mitchell had strong discussions with their superiors to convince them of the importance of independence from land and naval force aviation. This cost each court-martial, with Douhet remaining in prison for a year and Mitchell, already a general, demoted to colonel.

Douhet addressed the distance between the combat front and the rearguard when he pointed out that, before the advent of the airplane, it was not possible to go beyond the battle lines without first breaking them, a fact that had been superseded by aviation. He found that, despite that WWI had affected entire

nations, only a minority of citizens fought and died, while the majority continued to live, work, and supply the means to fight.<sup>6</sup> The air force had changed that dynamic. This analysis coincided with the ideas of Trenchard and Mitchell that the airpower was essentially offensive and strategic. An aircraft's ability to move in a three-dimensional arena gives it an offensive capacity that breaks the principle of war that the attacking forces need to be more numerous than the defensive ones. The plane reverses that equation.<sup>7</sup>

With that in mind, Douhet and Trenchard advocated using bombers as weapons capable of deciding the air war, in Douhet's vision of "air dominance" and in Trenchard's vision of "air superiority." Bombers would eliminate enemy aviation on the ground, destroy the country's industrial base, and destroy a population's morale.

During WWI, Mitchell suggested that the North American Expeditionary Force be divided into two sections: one "strategic" (with bombers on missions independent from ground and naval forces) and the other "tactical" (with reconnaissance and strike aircraft on behalf of ground and naval forces).<sup>8</sup> Having been commander of striker and fighter units in the European theater, even concurring with Douhet's and Trenchard's ideas on the use of bombers as a strategic and offensive weapon, Mitchell noted that, for bombers to carry out their mission, they must be protected by fighter aircraft.

Trenchard's key idea was that an air force should concentrate on bombers, how to select targets, and on the search for how to demoralize the enemy.<sup>9</sup> Seversky<sup>10</sup> emphasized this when referring to the British campaign in Norway, noting that the army, although superior to the German army, was defeated, having to withdraw due to Luftwaffe attacks by Messerschmitt and Heinkel aircraft. This cost the British their aircraft carrier *Glorious*, sunk during the evacuation of British troops from the city of Narvik. In the Skagerrak region, the British paid a heavy price for their fighter jets (Spitfires and Hurricanes) lacking sufficient range to protect both the navy and their bombers, a reverse situation to that of the Battle of England. Seversky further noted the superiority of land-based versus carrier-based aviation. Seversky observed that Germany, as well as other nations, did not have fighter jets with sufficient range.<sup>11</sup> In the campaign British against Norway, Germany's advantage was geographic. This reinforced Mitchell's view that bombers would only be effective if they were protected by fighter aircraft. Both English and German air forces had not focused on a strategic strike force (to achieve range), resulting in defeats for both sides, only in different geographical situations. The air forces' capabilities were taking advantage of existing technology, but this wasn't taken into consideration by strategists. As an example, Seversky cited the case of the German Condor, at that

time a civilian aircraft that could make the Berlin–New York flight nonstop and could have been adapted as a long-range bomber with a large cargo capacity.<sup>12</sup>

Mitchell's vision (protecting bombers), together with that of Gen Henry H. Arnold, commander of US Army Aviation in the 1930s (focused on developing technology to improve airpower), resulted in the development of the P-51 Mustang aircraft. This fighter jet was essential mainly due to its operating range, allowing the Allies to effectively carry out attacks on German territory during World War II (WWII).

Seversky emphasized quality over quantity, as an element linked to the development of technology.<sup>13</sup> Douhet and Trenchard, despite paying attention to technology, were more concerned with its employment rather than its development.<sup>14</sup> Another important element of the principles envisaged by Douhet and Mitchell was the contribution of state resources. Both believed more resources should be allocated to the air force than to the army and navy. Mitchell was so emphatic that, to convince the US Congress, he made an attack demonstration on American Navy ships, sinking three of them, which angered the admirals.<sup>15</sup>

An aspect that distinguishes Douhet from the other theorists is his focus on civil aviation. Douhet proposed centralizing aeronautics as an institution that would have jurisdiction over both military and civil aviation, subordinated to the state for the establishment of public policies of national security. However, he suggested separating activities that were of military interest from civilian ones. In Douhet's vision, "The Ministry of Aeronautics must have full competency to take care of all aeronautical matters."<sup>16</sup> However, for Douhet, unlike Arnold, "the State should not be concerned with industrial interests and, consequently, it would be advisable that . . . factories that produce aeronautical materials, repair shops, be left in the hands of private companies,"<sup>17</sup> which influenced how the Royal Italian Air Force's operations during WWII.

In Brazil, Douhet's writings greatly influenced aeronautics (centralizing civil and military aviation under a single body and making the air force independent), as did the US vision of uniting all aspects of airpower: aeronautical industry, civil aviation, airport infrastructure, technological development, and the air force. Brazil didn't make a distinction between flight levels, thus expanding this concept by including space as well, and designating it as aerospace power.

### *Final Considerations*

Thus, Douhet, Mitchell, and Trenchard, all converged on the need for the air force to be an independent organization, at the same level as ground and naval forces. Doctrinally, all of them recognized the air force as eminently strategic and offensive. All three theorists faced much resistance from leaders of the time.

Douhet and Mitchell argued that the air force should receive a larger distribution of resources, because if the nation were to be defeated in the air, ground and naval forces would immediately succumb if left without air protection. Seversky uses the British defeat in the Norwegian campaign as an example, where the navy lost the aircraft carrier *Glorious*.<sup>18</sup>

Operationally, Douhet, Mitchell, and Trenchard agreed that the Air Force should be organized around bomber aircraft to allow the conduct of offensive, strategic, and independent air operations against the enemy's industrial base and aviation—in addition to demoralizing the enemy population. However, Mitchell was the only one concerned with protecting bombers with fighter jets.

Douhet was the only theorist who dealt with civil aviation, either for mobilization or for state policy objectives. In his vision, civil and military aviation should be centralized in a single body, the Ministry of Aeronautics. This factor would influence, above all, the creation of the Brazilian Ministry of Aeronautics.

## The Structure of the Air Forces

### *Royal Air Force, United Kingdom*

The creation of the Royal Air Force on 1 April 1918 as an independent institution, was the result of a study by General Jan Smuts,<sup>19</sup> who had been appointed to study a way for the United Kingdom (UK) to defend itself against German air strikes. Until 1918, aviation was organized under the Royal Flight Corps and the Royal Naval Air Service, as units of the army and navy, respectively. Smuts suggested that aviation should be concentrated in a single institution, encompassing the aviation assets of the army and navy. Therefore, the idea of an independent institution in the UK belongs to General Jan Smuts, while it was Hugh Trenchard's turn to organize that new force.<sup>20</sup>

In response to the WWI German bombardment strategy against the UK, the British set up a defensive system based on reconnaissance and fighter aircraft, and anti-aircraft artillery. German airstrikes during WWI had a great impact on the frame of mind of the British population, which until then had long imagined themselves safe from any attack due to being an island, distant from Europe, and protected by the best navy in the world. However, “on 8 September 1915, the German Zeppelin, *Heinrich Mathy* . . . attacked the central area of London, killing 22 people and causing 500 thousand sterling pounds in damages.”<sup>21</sup> Thus causing the breakdown of the previously existing security paradigm. Douhet stated that “the effects of airstrikes, both material destruction and influence on the state of mind, are much greater than those caused by

all other known methods.”<sup>22</sup> It can be noted that Douhet probably based his analysis on the results of the bombings during WWI.

However, during WWII, the intense bombings against both Germany and the UK did not have the effect on the frame of mind of the population that strategists expected, especially Trenchard, who was a great supporter of strategic bombings. Trenchard, like Douhet, postulated that the air force should be predominantly structured in bomber aircraft and, therefore, advocated that government resources be used primarily for manufacturing such aircraft. However, with the experience gained in WWI due to the German attacks on its territory, the British government placed its resources on fighter aircraft, a factor that was decisive for the victory in the Battle of England.<sup>23</sup> This highlights the importance of Air Chief Marshall Sir Hugh Dowding in that victory. Dowding’s imagination and technical mastery over the air war were the momentum that produced the radar, the Spitfire aircraft, and the centralized Fighter Aircraft Command. According to Korda, Dowding probably was the only “important man in the United Kingdom who did not believe the bomber would be able to be surpassed.”<sup>24</sup>

### *United States Air Force, United States of America*

In the US, aviation was integrated into the United States Army, initially under the name of Army Air Service, from 1920 to 1926. From 1926 to 1941, aviation continued under the Department of the Army, but as the Army Air Corps.<sup>25</sup>

The independence of the United States Air Force (USAF) was only achieved after many clashes between the general officers of the Army, among them Maj Gen Oscar F. Westover, who throughout his career was opposed to the idea.<sup>26</sup> One of the most ardent advocates for air force independence was Gen Billy Mitchell, who had commanded American Expeditionary Force squadrons and strike groups in the European theater, where he was able to observe the use of the air force for offensive air operations, as well as to support surface forces.<sup>27</sup> Mitchell’s vision for an independent air force was greatly influenced by the creation of the British Royal Air Force in 1918.

Despite the internal turmoil, a headquarters for the Army Air Corps was established in 1936, to establish a body capable of organizing independent air operations and, at the same time, capable of supporting Army operations.<sup>28</sup> That was the first manifestation of an independent air force within the Army.<sup>29</sup>

However, essentially, the Air Corps was a branch of the Army, like the cavalry and infantry. Six months after the formation of the Air Corps Headquarters, a study recognized that the existing dual structure was harming aviation. In 1941, the situation was resolved by means of Army Regulation (AR) 95-5 on 20 June

1941, which placed the Army Air Forces Chief of Staff directly subordinate to the Secretary of War.<sup>30</sup> Despite recognition of the need for aviation to be independent in operational and administrative terms, land-based military aviation still remained under the command of the Army throughout WWII. It was not until 18 September 1947 that the USAF was officially created.

The belief that quality was better than quantity influenced the structuring of aviation in the United States as an integrated system, having technology as a foundation, with General Arnold as its principal mentor.<sup>31</sup> Daso observed that before Gen Arnold assumed the post of Commanding General of Army Air Forces, administrative systems that should have allowed the development of high-quality weaponry, or at least the institutionalization of this process, had been neglected by the Army.<sup>32</sup> Gen Arnold established a technological foundation, with Dr. Theodore von Kármán, as one of his main advisors, and conceived a plan for the development of US airpower, even using knowledge obtained from German scientists through the Lusty (*Luftwaffe* Strategic Technology) project.<sup>33</sup> To Dr. Kármán, aviation combined industry, schools, transportation, airfields, construction, management, ammunition and weapons, metallurgy, financing, public security, and national defense.<sup>34</sup> Brazil adopted this integrated vision of airpower in 1968, when the Aeronautics General Staff, within the framework of the Multi-Annual Investment Plan, created as an objective, the “Maintaining and Strengthening of the Air Force, Civil Aviation, Aeronautical Industry and Indispensable Technology.”<sup>35</sup> At the beginning of his tenure as Commanding General of Army Air Forces, Arnold established a Council of Advisors, directly subordinate to him, whose mission was to organize tasks and help in the “thinking process.”<sup>36</sup>

### *German Air Force, The Luftwaffe*

When it comes to strategic employment, German aviation was the first to make use of a systematic air campaign. In early 1915, it began with *Zeppelins* taking off from their North Sea bases to drop bombs on UK military and industrial targets during long night flights.<sup>37</sup>

However, despite its status as a separate force, the *Luftwaffe* always remained under the control of the High Command in terms of its doctrinal development and equipment. German Air Force missions (fighter, transport aviation, and paratroopers) were always planned to support its army (*Wehrmacht*), thereby reducing the ability to carry out independent and strategic air operations.<sup>38</sup>

Although German strategists considered the lessons learned in WWI important, coinciding their doctrinal vision with that of Douhet, Mitchell, and Trenchard, they believed that the air force was an important component of the

war in combination with land and naval forces. Therefore, air force employment was integrated into traditional doctrine to win short wars. These factors led to the development of aircraft such as the Stuka bomber and the *Blitzkrieg* (lightning war) doctrine. As an independent air force, the Luftwaffe was born on 26 February 1935.

During WWII, the German Air Force came closest operationally to Douhet's theory regarding strategic bombing with the aim of destroying the enemy air force, destroying the state of mind of the civilian population, and conquering air dominance. However, it failed because it had not given due attention to a principle defended by Billy Mitchell: bombers needed protection. Since German fighters had a short range, their bombers were left unprotected in British airspace.<sup>39</sup> The German recognized that need late in the war, with the advent of the Messerschmidt 262, a jet aircraft.

Korda stressed that both the Germans and the British "were passionate about the idea of the *Schnellbomber* (fast bomber) being faster than the fighters available to intercept it."<sup>40</sup> Korda pointed out that the Germans assimilated the idea of the *Schnellbomber* incredibly early, with the mass production of the Heinkel 111, which could only carry a small payload. Göring (then Luftwaffe commander) was more interested in quantity than in efficiency, which ended up compromising Germany's bombing capability.<sup>41</sup>

Germany did not pursue long-range aircraft, even for strategic bombing—even though its Condor civilian aircraft had the capability for crossing the Atlantic without refueling, it was not converted into a long-range bomber.

### *Military Aeronautics, Italy*<sup>42</sup>

In 1917, the Military Aeronautical Corps was officially established, subordinate to the Ministry of War and organized into two commands, four battalions, an aeronautical construction establishment, a Technical Directorate of Military Aviation, and a Central Aeronautical Institute. Despite all of Giulio Douhet's efforts to make Italy's air force independent from its land and naval forces, Italy's Royal Aeronautics was not created until 28 March 1923. Until then, even with the publication of Douhet's book *Command of the Air* under the auspices of the Ministry of War, debate was intense without reaching an agreement, mainly due to opposition by the army and navy.

During WWI, the Military Aeronautical Corps, despite focusing on bomber aircraft, did little as an offensive and strategic air institution, limiting itself to supporting the surface force, mainly on Austrian lines and the naval force on patrol over Trieste, Istria, and the Otranto Channel.



At the beginning of WWII, the *Regia Aeronautica* was organized, but with few aerial assets to face allied aircraft. From 1939 to 1943, the *Regia Aeronautica* organized its air force with 70 percent medium-range bombers with limited payload capability. The Italian aviation industry was dominated by the giant Fiat, which focused on using air-cooled engines, considering them less vulnerable in air combat and more reliable than water-cooled ones. However, this limited the operational capability of bomber aircraft as air-cooled engines were less powerful.

Until the end of WWII, the Italian Air Force retained the same structure and, in some instances, subordinating command to the Luftwaffe.

### *Giulio Douhet's Influence in the Creation and Organization of Aeronautics in Brazil*

Brazilian aeronautics was widely influenced by Giulio Douhet's theory, even in the naming of the Ministry of Aeronautics (MAER). The most notable event of the "Campaign for the creation of the Ministry of Aeronautics, in Brazil . . . was the Conference held at the Military Club, on February 20, 1935, by Captain Antonio Alves Cabral who, the previous year, had completed a training phase in the Royal Italian Air Force." An article by Captain Lyra Tavares, in 1937, had an impact on public opinion and in governmental spheres "with President Vargas expressing to his Minister of Labor his agreement with the creation of the new body . . . based on sound technology and under the conditions presented by Captain Tavares."<sup>43</sup> This started a joint effort between the military, civilian society, and government towards the creation of the MAER.

Initially, the Brazilian government did not create a separate air force, as it was centralized under the MAER.<sup>44</sup> However, Decree No. 3.302 issued 22 May 1941, created the FAB,<sup>45</sup> and therefore, as per Douhet,<sup>46</sup> a force was born independent from the army and the navy.<sup>47</sup>

MAER's organization was standardized in October 1941 into four large agencies: General Staff, Aerial Zones, Directorates, and Aeronautics Finance Service.<sup>48</sup> Due to MAER's involvement in civil aviation, in 1941 the Route Directorate and the Civil Aviation Directorate were also created.<sup>49</sup> The FAB was formally organized in 1942, consisting of territorial commands, large air units, partnership air units, aviation units, and guard and infantry units.<sup>50</sup> Decree No. 3.302 also included the definition of each unit, and scope of its air operations in combination with the army and the navy in the defense of the nation. For example, air bases "are places destined for permanent or even tem-

porary parking of air units, having facilities and means for ensuring their life, work and employment.”<sup>51</sup> This concept is still in use.<sup>52</sup>

The decree highlights the independence of the air force as necessary to carry out offensive and strategic air operations. However, since it absorbed army and naval aviation, it also stresses the need to support to these forces are part of its mission as well. It established, for the first time, that the national armed forces were made up of the army, navy, and air force.<sup>53</sup> This would be constitutionally recognized in 1946.<sup>54</sup>

Its main missions at that time included reconnaissance; data transmissions; air interdiction; protection of friendly aircraft; and combat, destruction of ground and sea targets.<sup>55</sup>

When analyzing the organization of the MAER and the FAB, the Douhetian concept of a central body over military and civil aviation is clear. This structure was only modified in 1994, when the aeronautical industry and responsibility for aerospace policy would fall under MAER.

## **Conclusion**

The ideas of the three airpower theorists coincide around the relevance of an independent air force as an armed force, and the need for a greater share of state resources in comparison with ground and naval forces. All three envisioned that the defeat of a nation in the air would unfortunately mean defeat in war. However, Douhet, Mitchell, and Trenchard differed on the concept of an air force’s structure, and its administrative and organizational apparatus. The Italian theorist advocated creating a centralized structure as public policy, with command over civil and military aviation, as the responsibility of the state. Mitchell and Trenchard were more concerned with an air force’s military employment, doctrine, and equipment.

In summary, Douhet’s vision was broader in terms of theory, while Mitchell’s and Trenchard’s were strictly focused on its military use. In terms of operational structure and equipment, they all gave great importance to the primacy of the bomber, due to its ability to destroy the enemy’s industrial base, aviation, and will of the people. Mitchell was the only one who emphasized the need to protect bombers to make their employment more effective.

The ideas of these airpower architects influenced the organization of western air forces, mainly the need for an independent air force.

Air forces evolved differently in terms of administrative and operational structure, and technological vision. For example, the USAF evolved with the support of technology, even capitalizing on existing German technology at that time. Bra-

zilian aviation, on the other hand, emerged as a centralized hybrid structure (civil and military), with responsibility for civil aviation development as well.

Taking advantage of the ideas of Douhet, Mitchell, and Trenchard, American and Brazilian strategists emphasized that airpower was much more than its employment—it consisted of industry, technology, airport infrastructure, civil aviation, and the air force. □

## Notes

1. MacIsaac, David. Voces del Azul: Teóricos del Poder Aéreo (Voice from the blue: Air power theorists.) In builders of modern str: From Machiavelli to the nuclear era. Edited by Peter Paret, with the cooperation of Gordon A. Grace and Felix Gilbert, translated by Joubert de Oliveira Brízida, Rio de Janeiro, Biblioteca do Exército Editora, 2001. p. 211.

2. MacIsaac (2001), p. 226

3. MacIsaac (2001), p. 219.

4. DASO, Dik, A. Architects of American Air Supremacy: Gen. Hap Arnold and Dr. Theodore von Kármán, Maxwell, AFB, Alabama USA, Air University Press, 1997. P. 5-6.

5. Daso (1997), p. 194.

6. Douhet, Giulio. O Domínio do Ar (Command of the air). Translation by the Officer Training School. Belo Horizonte, Editora Itatiaia (Rio de Janeiro), Instituto Histórico de Aeronáutica, 1988. p. 30.

7. Douhet (1998), pp. 30–38.

8. Clodfelter, Mark, A. Modeling Air Power Convictions: Development and legacy of William Mitchell's strategic thought The Path of Heaven: the evolution of Air Power theory. Chapter three. Maxwell Air Force, Alabama, School of Advanced Airpower Studies, Air University Press, 1997, p. 85.

9. Meilinger, Phillip S. The Path of Heaven: the evolution of Airpower theory. Alabama, Maxwell Air Force Base, The School of Advanced Airpower Studies, Air University Press, 1997. p. 52.

10. Seversky, Alexander, P. A Vitória Pela Força Aérea (Victory by the Air Force). Translation by Asdrúbal Mendes Gonçalves. Belo Horizonte, Editora Itatiaia, Instituto Histórico-Cultural da Aeronáutica (Rio de Janeiro), 1988. pp. 44–47.

11. Seversky (1988), p. 46.

12. Seversky (1988), p. 47.

13. Seversky (1988), p. 77.

14. Seversky (1988), p. 135.

15. Seversky (1988), p. 135.

16. One of them the German battleship *Ostfriesland*, in Virginia Capes, July 1921.

17. Douhet (1998), p. 113.

18. Douhet (1998), p. 120.

19. Seversky (1988), pp. 44–47.

20. South African general requested by the British government to carry out studies to prevent German attacks against London during WWI.

21. Meilenger (1997), p. 71.

22. Source: <https://seuhistory.com/hoje-na-historia/centro-de-londres-e-atacado-por-dirigivel-alemao-na-primeira-guerra>. Acesso em 1/08/2018.
23. Douhet (1998), p. 48.
24. KORDA, Michael. *Con alas de águila: Una historia de la Batalla de Inglaterra (With Wings Like Eagles: A History of the Battle of Britain)*. Translation by Maria Beatriz de Medina. Rio de Janeiro, Objetiva, 2011. pp. 11–33.
25. Korda (2011), p. 25.
26. Daso (1997), p. 7.
27. Daso (1997), p. 55.
28. Source: Available in: <http://www.airforce.com/learn-about/history/part1/>. Consulted 16 May 2018. Reference to military aviation that still belonged to the United States Army.
29. Daso (1997), p. 55.
30. Daso (1997), pp. 55–57.
31. Gen Henry H. Arnold was the aviation commander of the US Army (Army Air Forces) during WWII. Source: <http://www.airpower.maxwell.af.mil/airchronicles/cc/arnold.html>. Consulted 15 June 2018.
32. Daso (1997), pp. 193–194.
33. Daso (1997), pp. 97, 128–129.
34. Daso (1997), p. 57.
35. Brazil. Ministry of Aeronautics. Multiannual Investment Plan aéreo da Aeronáutica. Plano Plurianual de Investimentos. Ordinance n°. 88/GM7, 7 October 1968. p. 5.
36. Daso (1997), p. 7.
37. Meilenger (1997), p. 42.
38. MacIsaac (2001), p. 228.
39. Seversky (1988), p. 47.
40. Korda (2011), pp. 31–32.
41. Korda (2011), p. 32.
42. Source: Available in: <http://www.aeronautica.difesa.it/storiaTradizione/LaStoria/Pagine/laGrandeGuerra.aspx>. Consulted 10 June 2018.
43. Lavenère-Wanderley, Nélon, Freire. *Historia de la Fuerza Aérea Brasileña (History of the Brazilian Air Force)*. Ministerio de Aeronáutica, Biblioteca do Exército Editora, 1966.
44. Brazil. Decree no. 2.961, 20 January 1941. Creates the Ministry of Aeronautics. Available in: [www.senado.gov.br](http://www.senado.gov.br). Consulted 20 August 2009, Article 8.
45. Brazil (1941), art. 1°.
46. Douhet (1998), p. 57.
47. It gives a new name to the National Air Forces and their establishments. This fact stands out as a correction to the previous idea of National Aviation, since, by renaming the newly created Air Force, the legislator characterizes the creation of the Air Force, as an independent organization from the Army and Navy. In 1946, the constitution of the time will characterize the Armed Forces with the name of Aeronautics. Available at: [www.senado.gov.br](http://www.senado.gov.br). Consulted on 8 March 2008.
48. Brazil. Decree no. 3.730, 18 October 1941.
49. Brazil. (c). Decree no. 3.730, 18 October 1941, §§ 6° and 8°, art. 7°. Organizes the Ministry of Aeronautics. Available in: <http://www6.senado.gov.br/legislacao/ListaPublicacoes.action?id=103346>. Consulted 27 January 2010.

50. Brazil. Decree no. 4.478, 14 July 1942. Organizes de Brazilian Air Force during peace time. Available in: [www.senado.gov.br](http://www.senado.gov.br). Consulted 8 March 2008.

51. Brazil (1942), art. 12.

52. The air unit is not a permanent organization of an air base.

53. Brazil (1942), art. 1º.

54. Brazil Constitution of the United State of Brazil. Issued 18 September 1946. Available in: [http://www.planalto.gov.br/ccivil\\_03/Constituicao/Constitui%C3%A7ao46.htm](http://www.planalto.gov.br/ccivil_03/Constituicao/Constitui%C3%A7ao46.htm). Consulted 2 February 2010.

55. Brazil (1942), art. 3º.



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