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THE CREATION AND USE OF DIVISION ARTILLERY IN THE AMAZON REGION

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Service Paper

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THE CREATION AND USE OF DIVISION ARTILLERY IN THE AMAZON REGION

AIM

1. This service paper analyzes the possibility of creating and employing division-level artillery to support the Brazilian Army in the Amazon. In conducting this analysis, this work will examine the characteristics of the region and the related influence on military operations, identify the capabilities of the fire support elements of a division artillery, and propose a division artillery asset as fire support for army units in the region. This analysis will make it possible to create recommendations regarding artillery support for troops operating in the Amazon region.

INTRODUCTION

2. The use of fire support from the Brazilian Army's field artillery in all regions of Brazil is a relevant deterrent factor in the country's strategic context. The complexity of the Amazon region and its extensive border reveal the need for a robust military presence in that part of the territory.[1] The Amazon region occupies approximately 52% of the national territory and has about 13,190 km of borders with several countries.[2] There are a series of threats and obstacles present in that part of the country, such as drug trafficking, weapons trafficking, and instability in in neighboring countries.[3]

3. It is essential to mention that the fire support currently available to a brigade in the Amazon is one organic 105 mm field artillery group, which provides continuous and close support to the brigade's maneuver elements.[4] The Amazon region is home to six jungle infantry brigades. Still, no army division is currently assigned to operate there, and there is no active division-level artillery in the region. If those resources were available in the region, they could increase the fire support provided to the jungle brigades in case of war. In this paper, I argue that despite the absence of a division structure, there is a requirement for division-level artillery. It is also relevant that providing fire support in the vastness of the Amazon environment will be a significant challenge for the Brazilian Army.

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[1] Brasil, Exército Brasileiro, "Comando Militar da Amazônia", accessed December 09, 2023, https://cma.eb.mil.br/.

[2] Instituto Brasileiro de Geografia e Estatística, "Zoneamentos Ecológico-Econômicos dos Estados da Amazônia Legal," accessed December 14, 2023, https://www.ibge.gov.br.

[3] Segurança, Justiça e Cidadania, "Fronteiras, Armas e Drogas," Brasília: Ministério da Justiça, *Secretaria Nacional de Segurança Pública*, 2014, Nº 8. Ano 4, ISSN 2178-8324, 15, accessed November 07, 2023, https://nev.prp.usp.br/wp-content/uploads/2019/09/Revista-8-Senasp.pdf.

[4] Brasil, Ministério da Defesa, Exército Brasileiro, *EB70-MC-10.334 - Manual de Campanha Brigadas de Infantaria*, 1. Ed, Brasília, DF, 2023, 2-2.

DISCUSSION

Regional Characteristics and their influence on Military Operations

4. The Amazon Region covers the states of *Pará, Amazonas, Acre, Rondônia, Amapá, Roraima,* part of *Maranhão* and *Tocantins* (Figure 1).[5] In the Amazon, there are two operating environments with very different characteristics. The equatorial forest consists of the jungle and has an extensive waterway network influenced by the rainfall regime.[6] *Lavrado*, the other operational environment characteristic of the Amazon and found in the states of *Roraima* and *Amapá*, is a region where military

employment is applied conventionally, as its terrain resembles other environments in Brazil.[7] All jungle brigades are capable of operating in both environments.

Figure 1- Brazilian states that make up the Amazon.
Source: Brasil, Exército, Estado-Maior, *IP 72-1 - Operações na Selva*, 1. Ed, Brasília, 1997, 2-2.

5. The climate in the equatorial Amazon region is hot and humid, with two well-defined seasons.[8] Due to meteorological conditions, the time of year becomes a dominant factor in planning the use of military forces.[9] During the dry season, some water courses disappear, and land routes are more accessible; however, during the rainy season, movement by river becomes the most viable, and movement through the jungle becomes difficult.[10]

6. Another factor related to the environment is that the extensive vegetation cover and the poor road network make ground troop movement difficult, restricting the use of motorized, mechanized, and armoured means of transport.[11] In this context, waterway and air transport are much more important than road transport.[12]

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[5] Instituto Brasileiro de Geografia e Estatística, "Zoneamentos Ecológico-Econômicos dos Estados da Amazônia Legal."
[6] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.223 – Operações*, 5. Ed, Brasília, DF, 2017, 6-1.
[7] Instituto Brasileiro de Geografia e Estatística, "Zoneamentos Ecológico-Econômicos dos Estados da Amazônia Legal," accessed December 14, 2023, https://www.ibge.gov.br.
[8] Brasil, *EB70-MC-10.223 – Operações,* 6-1.
[9] Brasil, *EB70-MC-10.223 – Operações,* 6-1.
[10] Brasil, *EB70-MC-10.223 – Operações,* 6-1.
[11] Brasil, Exército, Estado-Maior, *IP 72-1 - Operações na Selva*, 1. ed. Brasília, 1997, 2-8.
[12] Brasil, Exército, *IP 72-1 - Operações na Selva*, 2-8.

7. The dense forest cover makes it difficult to use fire support, by restricting communications and limiting the ability to coordinate and control forces.[13] For these reasons, there is a tendency for the main tactical actions to occur along axes, whether aquatic or land-based.[14] Units specialized in jungle operations adapt to the peculiarities of the environment, employing decentralization, combat in rivers, and adjusting to meteorological changes.[15] All the characteristics of the jungle mentioned above contribute to the need for specific planning for the use of artillery.[16]

The Army Organization in the Amazon Region

8. Because of the size of the Amazon and its extensive borders, it is challenging for the Brazilian military to monitor the region. The Brazilian Army, to support the maintenance of sovereignty and to face new security threats in the Amazon region, is organized into Military Commands.[17] Military Commands are divided into brigades and are part of the basic organization for employing troops. The Amazon Region is covered by the Amazon Military Command (CMA) and by the North Military Command (CMN). The Amazon Military Command (CMA), headquartered in *Manaus*-AM, has the states of *Roraima, Rondônia, Amazonas*, and *Acre* as its areas of responsibility.[18] Its subordinate brigades are: the 1st Jungle Infantry Brigade, 2nd Jungle Infantry Brigade, 16th Jungle Infantry Brigade, and 17th Jungle Infantry Brigade.[19]

9. The North Military Command (CMN), headquartered in *Belém*-PA, is responsible for the states of *Pará, Amapá, Maranhão*, and the region north of *Tocantins*.[20] Its subordinate brigades are: 22nd Jungle Infantry Brigade and the 23rd Jungle Infantry Brigade.[21] Despite the existence of six jungle infantry brigades, the Amazon Region has no army division.

The Army Division and its Division Artillery

10. A typical Brazilian Army division's flexible organizational structure enables it to adapt to any operational requirements.[22] Figure 2 highlights the possibility of the presence of division artillery in a division structure.[23]

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[13] Brasil, *EB70-MC-10.223 – Operações,* 6-1.
[14] Brasil, *EB70-MC-10.223 – Operações,* 6-1.
[15] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 5. ed. Brasília, DF, 2020, 15-2.
[16] Brasil, Exército, Estado-Maior, *IP 72-1 - Operações na Selva*, 1. ed. Brasília, 1997, 2-8.
[17] Brasil, Exército Brasileiro, "Estrutura Organizacional," accessed December 14, 2023, https://www.eb.mil.br/estrutura-organizacional.
[18] Brasil, Exército Brasileiro, "Estrutura Organizacional do Comando Militar da Amazônia," accessed December 14, 2023, https://cma.eb.mil.br/.
[19] Brasil, "Estrutura Organizacional do Comando Militar da Amazônia."
[20] Brasil, Exército Brasileiro, "Estrutura Organizacional do Comando Militar do Norte," accessed December 14, 2023, https://cmn.eb.mil.br/.
[21] Brasil, Exército Brasileiro, "Estrutura Organizacional do Comando Militar do Norte."
[22] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.243 - Divisão de Exército*, 3. Ed, Brasília, DF, 2020, 2-3.
[23] Brasil, *EB70-MC-10.243 - Divisão de Exército*, 2-3.

11. Division artillery is an organization directly under an army division, consisting of artillery units and subunits.[24] Its employment characteristics include flexibility, modular composition, and adaptability, which are necessary to meet many employment alternatives.[25] Modular composition with associated flexibility would be particularly important in the Amazon given the vast distances in the region.

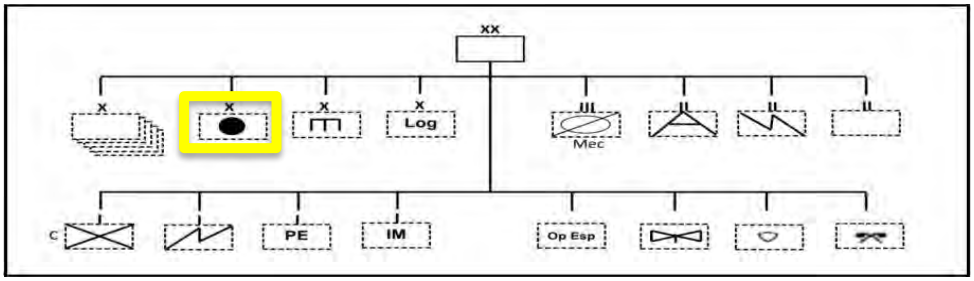

Figure 2: Organization of a Brazilian Army division.
Source: Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.243 - Divisão de Exército*, 3. ed, Brasília, DF, 2020, 2-3.

12. The military employs division artillery fire to weaken the enemy's command capacity, logistical support, and firepower, thereby limiting their movement and mobility.[26] In addition, it can receive the tactical mission of general support or general support reinforcing, serving as additional fire support for elements in the fighting brigades.[27] Division artillery can intensify the fire support provided by the organic artillery groups of the brigades because of its ability to reinforce directly the fires of those units or by assigning units/subunits to reinforce brigades.[28]

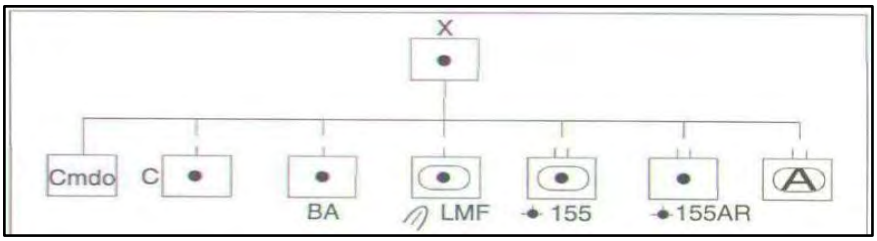

Figure 3: Basic structure of division artillery.
Source: Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-5.

13. As shown in Figure 3, the basic structure of division artillery includes one headquarters battery, one field artillery group (155 mm howitzer towed), one field artillery group (155 mm howitzer self-propelled), one missile and rocket artillery

[24] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MF-10.102 – Doutrina Militar Terrestre*, 2. Ed, Brasília, DF, 2019.
[25] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-5.
[26] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-1.
[27] Brasil, *C6-21 - Artilharia da Divisão de Exército*, 2-1.
[28] Brasil, *C6-21 - Artilharia da Divisão de Exército*, 2-1.

group, one air defense artillery group, and one target acquisition battery.[29] Division artillery carries out counterbattery fire within the range of its weapons to obtain superiority over enemy field artillery and mortars.[30] It performs target acquisition tasks using the means available in its echelon.[31] Despite the importance of division artillery, this brigade level command does not exist in the Amazon Region, with fire support restricted only to jungle field artillery groups.

The Field Artillery Available in the Amazon Region

14. The jungle field artillery groups, integrated into the jungle infantry brigades, are currently the only artillery units in the Amazon region, and there are only two of these. The 10th Jungle Field Artillery Group (105 mm) in *Boa Vista-RR* is organic to the 1st Jungle Infantry Brigade and the 1st Jungle Field Artillery Group (105 mm) in *Marabá-PA* is organic to the 23rd Jungle Infantry Brigade.[32] These groups possess high mobility and are armed with light howitzers, making them easily transportable by helicopters, aircraft, animals, and even small vessels (Figure 4).[33]

Figure 4: Small vessels carrying the 105mm/14 M 56 OTO MELARA howitzer.
Source: Brasil, Exército, 10° Grupo de Artilharia de Campanha de Selva. Relatório Final dos Exercícios de Experimentação Doutrinária (2003-2005), Apoio de Fogo na Amazônia, Boa Vista, 2006, 11.[34]

15. The 1st and 10th Jungle Field Artillery Groups have the 105mm/14 M 56 OTO MELARA howitzer (Figure 5), which they can disassemble for transportation.[35] The maximum range with conventional ammunition is 10000 m, limiting fire support and making it necessary for artillery always to be very close to maneuver elements.[36] The 1st and 10th Jungle Field Artillery Groups consist of two batteries, six guns each, and

[29] Brasil, *C6-21 - Artilharia da Divisão de Exército*, 2-5.
[30] Brasil, *C6-21 - Artilharia da Divisão de Exército*, 2-1.
[31] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-1.
[32] Brasil, Exército Brasileiro, "10º Grupo de Artilharia de Campanha de Selva," accessed December 14, 2023, https://10gacsl.eb.mil.br/. Brasil, Exército Brasileiro, "1º Grupo de Artilharia de Campanha de Selva," accessed December 14, 2023, https://23bdainfsl.eb.mil.br/index.php/1-grupo-de-artilharia-de-campanha-de-selva.
[33] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 5. ed. Brasília, DF, 2020, 15-3.
[34] Brasil, Exército, 10° Grupo de Artilharia de Campanha de Selva. "Relatório Final dos Exercícios de Experimentação Doutrinária (2003-2005)," Apoio de Fogo na Amazônia, Boa Vista, 2006, 11.
[35] Brasil, Ministério do Exército, Manual de Campanha *C 6-80 Serviço da Peça do Obus 105mm/14 M 56 OTO MELARA*, 1. ed. Brasília, DF, 1983, 1-3.
[36] Brasil, *C 6-80 Serviço da Peça do Obus 105mm/14 M 56 OTO MELARA*, 1-3.

one headquarters battery. The size of the region requires the use of decentralized action of the artillery batteries, prioritizing decentralized continuous and close fire support to the detriment of centralization.[37]

Figure 5: 105mm/14 M 56 OTO MELARA howitzer
Source: Brasil, Exército, 10° Grupo de Artilharia de Campanha de Selva. Relatório Final dos Exercícios de Experimentação Doutrinária (2003-2005), Apoio de Fogo na Amazônia, Boa Vista, 2006, 9.[38]

16. In the Amazon environment, observation and target acquisition face challenges; in particular, vegetation absorbs radio waves, reflects radar, and impairs night vision.[39] Ground observers face field-of-view limitations, requiring specialized terrain knowledge.[40] The restrictions imposed by the terrain for the centralization of the fires and the decentralized way of acting by the batteries makes it impractical to conduct effective preparation fires or counter-preparation fires.[41]

17. Due to the lack of artillery units, limited range of 105 mm guns, scarcity of areas for deployment, and mobility compromised by the lack of land routes in the Amazon theater of operations, it is essential to obtain additional fire support for the region, which the Brazilian Army still does not have.[42] Overall these factors suggest the need for division artillery in the area.

A Division Artillery Proposal for the Amazon Region

18. Division-level artillery, once created, must have a structure capable of receiving additional elements to complement its fire support.[43] Division artillery can be specifically structured to operate using its best capabilities in the jungle environment, utilizing the flexibility, adaptability, and modularity.[44] Despite the enhanced capabilities it is still essential to understand that the distances involved and

[37] Brasil, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 15-2.
[38] Brasil, Exército, 10° Grupo de Artilharia de Campanha de Selva. "Relatório Final dos Exercícios de Experimentação Doutrinária (2003-2005)," Apoio de Fogo na Amazônia, Boa Vista, 2006, 11.
[39] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 5. ed. Brasília, DF, 2020, 15-5.
[40] Brasil, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 15-5.
[41] Brasil, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 15-2.
[42] Brasil, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 15-3.
[43] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-5.
[44] Brasil. *C6-21 - Artilharia da Divisão de Exército*, 2-5.

the ranges of the weapons would make it impossible to have full indirect fire support in the region.

19. Unlike other division-level artillery in Brazil, the division artillery in the Amazon would combine one headquarters battery, four field artillery groups with 105 mm howitzers, two field artillery groups with 155 mm howitzers, one towed and the other wheeled self-propelled, one missile and rocket artillery group, one air defense artillery group, and one target acquisition battery.[45]

20. The headquarters battery would support the division artillery command with personnel and materials.[46] The Headquarters Battery installs the Division Artillery Command Post, provides logistical support, communication, topographic and meteorological data, and security.[47]

21. The field artillery group (105 mm howitzer) would support the division artillery by fire and reinforce those jungle infantry brigades without artillery units. The four field artillery groups would consist of two batteries with six guns each and one headquarters battery. Having four field artillery groups is relevant for the division artillery because there are currently only two organic field artillery groups supporting the six jungle infantry brigades in the Amazon.

22. Using other field artillery groups with the same versatility as 105 mm-caliber materials could minimize the jungle's lack of fire support resources. The most suitable weapon for the region would be the 105mm/14 M 56 OTO MELARA howitzer, which is highly portable and easily transported by various means, such as helicopters, aircraft, animals, and vessels.[48] It is also effective in the equatorial forest or *Lavrado* environment.

23. The field artillery group (155 mm howitzer), both towed and wheeled self-propelled, would have the mission of providing fire support, deepening the combat zone beyond the range of the 105 mm guns, especially if ammunition with extended range is available.[49] The two field artillery groups would consist of three batteries with six guns each and one headquarters battery intensifying fires from other field artillery units, especially from the field artillery groups of the brigades employed in the fighting echelon. Field artillery group 155 mm howitzer can support the force as a whole, as their conventional ammunition can reach ranges of up to 20 km and even fire with precision ammunition.[50] The 155 mm howitzer self-propelled can enter and then exit positions quickly after the execution of a fire mission.[51] In this case, the field artillery group self-propelled would be better employed in *Lavrado* environment, such as found in *Roraima* or *Amapá,* giving the possibility to move through regular terrains and roads, providing mobility and security to the members of this group. Field artillery group 155 mm howitzer towed would operate in the equatorial forest and use

[45] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-5.
[46] Brasil. *C6-21 - Artilharia da Divisão de Exército*, 2-6.
[47] Brasil. *C6-21 - Artilharia da Divisão de Exército*, 2-6.
[48] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.360 - Grupo de Artilharia de Campanha*, 5. ed. Brasília, DF, 2020, 15-3.
[49] Brasil. *C6-21 - Artilharia da Divisão de Exército*, 2-9.
[50] Brasil. *C6-21 - Artilharia da Divisão de Exército*, 2-9.
[51] Brasil. *C6-21 - Artilharia da Divisão de Exército*, 2-10.

vehicles and helicopters for transportation. It is worth noting using these howitzers in a jungle environment will be a challenge, mainly due to the characteristics of the terrain that will impose major limitations.

24. Unlike the field artillery group (155 mm howitzer), the missile and rocket artillery group would have the mission to carry out fires against targets of interest at operational and strategic levels.[52] The mission would be to provide the most precise and powerful firepower available to the division artillery in a jungle environment, focusing on strategic targets, such as essential structures, centers of gravity, and large targets.[53] They would also use fire for counter-battery purposes.[54] Due to the size and complexity of the Amazon region in Brazil, the missile and rocket organization would consist of three batteries.[55] More typically this group would operate with two batteries in a smaller geographic area. The missile and rocket artillery group would employ the ASTROS System, made by a Brazilian company, AVIBRAS. This system provides excellent deterrent power, as it can saturate areas and hit targets with precision at a distance of up to 90 km with rockets or 300 km with a tactical cruise missile. The missile and rocket artillery group would be better employed in a *Lavrado* environment, such as found in *Roraima* or *Amapá* however, due to its precision at a distance and the possibility of movement through regular terrain, it can quickly fire from roads, even in an equatorial forest (Figure 6).[56]

Figure 6: Astros 2020 on the border with Guyana
Source: Roberto Caiafa, "Brasil ativa o sistema Astros 2020 na fronteira com a Guiana," Infodefensa.com, November 2, 2015, accessed February 14, 2024, https://www.infodefensa.com/texto-diario/mostrar/3132541/brasil-ativa-sistema-astros-2020-na-fronteira-com-guiana.

25. The air defense artillery group would provide the air defense of units, installations, and protect sensitive points of direct interest to the division artillery.[57] It

[52] Brasil, Ministério da Defesa, Exército Brasileiro, Comando de Operações Terrestres, *EB70-MC-10.363 - Grupo de Mísseis e Foguetes*, Edição experimental, Brasília, DF, 2021, 2-1.
[53] Brasil, *EB70-MC-10.363 - Grupo de Mísseis e Foguetes*, 2-1.
[54] Brasil, *EB70-MC-10.363 - Grupo de Mísseis e Foguetes*, 2-1.
[55] Brasil, *EB70-MC-10.363 - Grupo de Mísseis e Foguetes*, 2-1.
[56] Roberto Caiafa, "Brasil ativa o sistema Astros 2020 na fronteira com a Guiana," Infodefensa.com, November 2, 2015, accessed February 14, 2024, https://www.infodefensa.com/texto-diario/mostrar/3132541/brasil-ativa-sistema-astros-2020-na-fronteira-com-guiana.
[57] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-8.

must be able to act against low-altitude aerial targets, hitting targets with speed and precision, working with a significant mass of fire, moving quickly, and occasionally acting against surface targets.[58] Furthermore, the air defense artillery would search, identify, monitor, and destroy targets of interest to the division artillery.[59] Despite the region's vastness, the air defense artillery group can operate efficiently in the equatorial forest or *Lavrado* environment due to the different weapons in its inventory.

26. The target acquisition battery would support the division artillery and complement other types of target acquisition.[60] It is essential to highlight that Amazon still has no target acquisition battery. In this sense, the creation of a division-level artillery would allow to search for targets under low meteorological or visibility conditions, coordinate target search means, regulate and adjust field artillery fire, and obtain and disseminate combat information.[61] Given these characteristics, it would be used under the supervision of the E2 of the division artillery and in the tactical mission of general support, aiming for centralized use by artillery.[62]

CONCLUSION

27. Division artillery is crucial in land operations in the jungle, allowing the commander to intervene more precisely and deepen the combat zone. The outstanding capability of the largest calibers, particularly the missile and rocket artillery, would play a decisive role in military actions.

28. When created to operate in the jungle, the division artillery combines firepower with efficient target acquisition and air defense protection. The firepower of the 155 mm howitzer provides excellent range, especially with precision ammunition and extended range, surpassing the 105 mm howitzers of the jungle field artillery groups. This extended range expands the area of influence in the Amazon.

29. A missile and rocket artillery group in the jungle division artillery is essential to give the Brazilian Army deterrence against state and non-state actors in the region with ranges of up to 90 km (rockets) and 300 km (tactical cruise missile).

30. The target acquisition battery, with remotely piloted aircraft, drones, and radars, would optimize the use of the division artillery, using local surveillance resources in the Amazon. Furthermore, protection by an air defense artillery group is vital for the anti-aircraft defense of division artillery and army division assets in jungle operations.

31. Division artillery must be used selectively and on targets of strategic value, that is, those that could cause the aggressor to lose its ability to fight. In this regard,

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[58] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-8.
[59] Brasil, *C6-21 - Artilharia da Divisão de Exército*, 2-8.
[60] Brasil, Exército, Estado-Maior, *C6-21 - Artilharia da Divisão de Exército*, 2. ed, Brasília, DF, 1994, 2-7.
[61] Brasil, *C6-21 - Artilharia da Divisão de Exército*, 2-7.
[62] Brasil, *C6-21 - Artilharia da Divisão de Exército*, 2-7.

the Brazilian Army must rely on divisional artillery's full firepower and capabilities to maintain deterrence in the strategic environment.

RECOMMENDATION

32. Given the evidence and analysis presented in this paper, the Staff of the Brazilian Army should take steps to establish the division-level artillery organization in the Amazon region.

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