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Strategic employment of joint precision airdrop

Empleo estratégico del lanzamiento inteligente de cargas

Emprego estratégico de lançamento inteligente de cargas

Erick Cozzo Betat de Souza[I]

ABSTRACT

This study is intended to analyze the possible ways of using the SHERPA Ranger joint precision airdrop system, acquired by the Brazilian Army (EB), as well as its possible employment by the Brazilian Air Force (FAB) vectors. Historical aspects of development, acquisition and support of the joint precision airdrop system (JPADS) are here discussed. The study covers the use of SHERPA Ranger by the Brazilian Armed Forces (FFAA), based on the Military Defense Doctrine (2007) and the Doctrine of Joint Operations (2011). It is also investigated whether the inclusion of this equipment as Product of Defense (PRODE) can increase the projection of national military power.

Keywords: Joint precision airdrop system. Operational capacity. Flight safety. JPADS.

RESUMEN

El objetivo del presente trabajo consiste en analizar las posibles formas de empleo del equipo de lanzamiento inteligente de cargas del tipo SHERPA Ranger, adquirido por el Ejército Brasileño (EB), así como sus posibilidades de empleo por los vehículos de la Fuerza Aérea Brasileña (FAB). Se abordaron los aspectos históricos del desarrollo, la adquisición y el soporte del equipo de lanzamiento inteligente de carga (JPADS). El estudio del problema abarcó las posibles contribuciones en el empleo de ese equipo en las Fuerzas Armadas (FFAA) brasileñas, basado en la Doctrina Militar de Defensa (2007) y en la Doctrina de Operaciones Conjuntas (2011), como también analizó si la inclusión de ese equipo como Producto de Defensa (PRODE) podría aumentar la proyección del poder militar nacional.

Palabras clave: *Lanzamiento inteligente de cargas. Capacidad operativa. Seguridad en el vuelo. JPADS.*

RESUMO

O objetivo do presente trabalho consiste em analisar as possíveis formas de emprego do equipamento de lançamento inteligente de cargas do tipo SHERPA Ranger, adquirido pelo Exército Brasileiro (EB), bem como suas possibilidades de emprego pelos vetores da Força Aérea Brasileira (FAB). Foram abordados aspectos históricos de desenvolvimento, da aquisição e suporte ao equipamento de lançamento inteligente de carga (JPADS). O estudo do problema abrangeu as possíveis contribuições no emprego desse equipamento nas Forças Armadas (FFAA) brasileiras, com base na Doutrina Militar de Defesa (2007) e na Doutrina de Operações Conjuntas (2011), como também analisou se a inclusão desse equipamento como Produto de Defesa (PRODE) pode aumentar a projeção do poder militar nacional.

Palavras-chave: *Lançamento inteligente de cargas. Capacidade operativa. Segurança no voo. JPADS.*

1 INTRODUCTION

From the end of the Cold War, according to Buzan (1991), an era of military personnel and material demobilization, the well-known Defense Products (PRODE) were rationalized by the world powers, since the maintenance of the Armed Forces (FFAA) which imposed burden or went over the state budget in order to dissuade the opposing bloc was no longer justified.

Innovative solutions that would allow resource saving and investments in manufacturing new materials on a large scale which made the most efficient use of the human resources, have emerged from a new profile

I. Secretariat of Economy and Finance (SEF) – Brasília/DF – Brazil. Major Intendant of the Brazilian Army (EB). Master in Military Sciences by Army Command and General Staff School (ECEME). E-mail: erickbetat@hotmail.com
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marked by the information age. All this happened at the same time as other mechanisms held the balance of power in the field of Geopolitics, based on the Theory of Games and on the performance of several actors in the world board (NYE, 2012).

From this context the study goes back to the historical origin of prospecting and to the development of joint precision airdrop system, demonstrating their application in the new conflicts and scenarios revealed in the twenty-first century. This new era, which produces continuous changes, is associated to the Theory proposed by Lellouche (1992), the **Theory of Uncertainties**.

Therefore, this work is intended to analyze the possible ways of using the SHERPA Ranger joint precision airdrop system acquired by the Brazilian Army (EB), as well as its possible use by the Brazilian Air Force (FAB) vectors. For this reason, the study was developed through a documentary research, which used the descriptive historical method after analysis of content, obtained from sources available in free databases such as Scielo, Google Scholar, available literature on the internet, and through participant-observation of the author during the training, preparation and briefing of the first launches of the equipment in Brazil (ALVES-MAZZOTTI; GEWANDSZNAJDER, 2004; BODGAN; BIKLEN, 1982; DENZIN; LINCOLN, 2005).

In order to meet its objective, the study covered the possible contributions of the employment of this equipment in the Brazilian Armed Forces, based on the Military Defense Doctrine (BRASIL, 2007) and on the Joint Operations Doctrine (BRASIL, 2011). It was also analyzed whether its inclusion as PRODE can increase the projection of national military power.

2 HISTORY AND EVOLUTION OF JOINT PRECISION AIRDROP SYSTEM (JPADS)

Joint precision airdrop systems were first introduced as a result of demands by the US Air Force and Army regarding safety aspects of aeronautical personnel and material. In parallel, they were also stimulated by the demand for provision of supplies to support troops deployed on the ground (BENNEY et al., 2005).

Such a need was first identified during the conflicts in Bosnia and Herzegovina (1993-1995) and, in that context, particularly during the execution of humanitarian actions. At that time, North Atlantic Treaty Organization (OTAN) aircraft of high strategic value and difficult to replace were usually targeted during these operations, with pilots being captured or killed, which constituted a considerable loss of human and material resources (WRIGHT; McHUGH; BENNEY, 2005).

As a consequence of the problems presented by the approach of the axes and routes of supply in relation to the points of support and combat front, and as a result of the technological evolution provided by the development of missiles with a high degree of precision, it was possible to use these guided missile systems, coupled to canopies for smart navigation, transforming them into airdrop guided by autonomous systems. Such fact put the air supply implementation theory away from the reach of land-based weapons, a viable and feasible possibility for this new type of combat (WRIGHT; McHUGH; BENNEY, 2005).

Benney et al. (2005) developed the project after the Department of Defense[1] (DoD) mandated that the United States Joint Forces Command (USJFCOM) coordinated actions between the United States Air Force (USAF) and the US Army. These centers were responsible for the development of the computer with the mission planning system and navigation equipment, with the cooperation of the US Industry of National Defense (IND).

According to the Defense Industry Daily website (JPADS..., 2015), in 2001, Canada sold the SHERPA 1200s System, produced by Mist Mobility Integrated Systems Technology Inc. (MMIST), and its entire planning and navigation technology package to initiate testing with this type of material in military operations to the US Marine Corps[2]. This investment cost USD 68,000 per equipment unit, while traditional unmanned launching systems cost USD 11,000 at the time.

Such characteristics of equipment prospecting and investment emerges in the new types of confrontation in the 21st century, where high capital and technology investments are required for effects that produce greater efficiency during military operations (BOUSQUET, 2008; BULEY, 2007).

According to the Defense Industry Daily (JPADS..., 2015), SHERPA was first used in Operations in October 2001 in the beginning of the fighting in Afghanistan, during the Operation Enduring Freedom (OEF), in which the United States ignored the deliberations of the United Nations and used their alliance with OTAN to attack. In the historical sequence, at that time the Americans persuaded the Security Council (CS/ONU) to use the force of the International Security Assistance Force (ISAF) in the region, in which the OTAN allied countries showed interest in acquiring the new equipment or even developing one with autochthonous technology.

[1] Department of Defense, equivalent to the Brazilian Ministry of Defense.

[2] US Army Marine Corps, constitute a separate Force apart from the Navy, different from what occurs in Brazil.

In 2004, in Operation Iraqi Freedom (OIF), the U.S. Marine Corps systematically employed SHERPA 1200s as a support in ground operations, primarily in advanced bases (first echelon). It consisted of an alternative process of supplying troops, due to the vulnerability of the fleet and helicopters in the operation area. In 2006, 3.5 million pounds of supply was dropped in Afghanistan, through traditional airdrop processes in addition to JPADS (BENNEY et al., 2005).

In 2007, US JPADS system, produced by Stronger Company, whose capacity was up to 2,000 pounds, started being operated in Afghanistan. Concurrently, DoD promoted the doctrinal updating of its Forces for the employment of JPADS (UNITED STATES, 2007).

In November 2008, in a three-tier step-by-step process on established platforms under development with smaller load capacities, the US company Airborne Systems successfully tested the GigaFly equipment. This system allowed the launch of a load of up to 40,000 pounds at a distance of up to 22 miles from the landing zone (ZP) and at an altitude of 25,000 feet. The wingspan or length of the canopy wing was 195 feet, close to the size of a Boing aircraft (UNITED STATES, 2007).

In November 2009, Ultra Light Weight JPADS, whose capacity ranged between 250-700 pounds, were developed to take advantage of the canopy of MC-5[3] (Intruder), the US Army's troop parachute canopy, whose prerequisites for launching ranged between 4,500-25,000 feet (UNITED STATES, 2007).

From then on, the tactical use of the equipment for small fractions began to be employed, because an air infiltration operation could be carried out, accompanied by a load similar to a free-fall military parachutist. This was made possible by the versatility of the equipment which, after leaving the aircraft, was able to become a leading navigator or to follow independently to the planned site, due to its ratios for falling and gliding, associated to the weight that proportionally would be identical to that of a combatant, and by adding an effective guiding system capable of conducting infiltration of the fraction to the planned site in the ZP.

It can also be considered that, probably, the development of this operational requirement considered the speed of displacement of the canopy coupled to the load (of 17-25 knots), which would make possible the infiltration of personnel with the accompanying supply, which is one of the characteristics of employment of special operations fractions.

In early 2010, according to the company's own website, one of the technical divisions of Airborne Systems®, a holding company component of a military research complex in aerospace research, HDT Aerospace® purchased the company and assumed current contracts with the US government and with other countries.

In April 2010, an official notice was issued for the research and development of a disposable canopy due to the location of the Dropping Zones (ZL) and ZP[4], which, in belligerent areas were off the road or in steep areas, making it difficult to collect and reuse the material (JPADS..., 2015).

It's relevant to highlight that the central navigation and system processing became more compact and easier to recover. This is important because part of the aggregate technological capital is deposited in it, and the access to the areas (ZL and ZP), before this compaction, had to be carried out by helicopters or vehicles in order to evacuate this material eventually. The disposable canopy decreased the weight and volume of the material, allowing the transport of the navigation center by the troop on foot. These studies which aimed for equipment improvements and cost reduction of assemblies were already being widespread scientifically, as observed at the 18th American Aerospace Industry Symposium (GILLES; HICKEY; KRAINSKI, 2005).

According to the Defense Industry Daily website (JPADS..., 2015), in May 2010, the US Marine Corps entered into a five-year agreement, which amounted to USD 45 million for acquisition and support of JPADS ULW. In June, pilot reports on missions supporting combat operations in Afghanistan attested:

> [...] we had difficulty performing the air supply, in which the aircraft needed to perform low altitude navigation (LAN) to approach the ZL, being exposed to actions of antiaircraft vectors and highly steep terrain, flying inside valleys flanked by high slopes and still with the least fuel due to the maximum utilization of the load capacity in the aircraft. Such facts characterized this mission as a suicidal mission. (JPADS..., 2015, p.1).

In July, researches presented by Benney et al. (2009) aimed at making the equipment whose capacity were up to 2,000 pound (2k) more compact, and Airborne was a success, whose FireFly weight (2k/1,000 sq.ft)[5] was reduced to the traditional G-12[6] medium-load parachute (32 pounds), which made possible its use in Remotely Piloted Aircraft (ARP).

[3] Airborne Systems® Intruder Navigable troop infiltration parachute, with opening possibilities at 25,000 feet over the Mean Sea Level (MSL).

[4] The term Dropping Zone is used for material; and Landing Zone, for personnel.

[5] 2k/1,000 sq.ft means that for the weight of 2,000 pounds, the canopy used has an area of 1,000 square feet.

[6] Conventional load-dropping parachutes with canopy sewn in circular format without navigation system.

While researches were being conducted in 2011 (up to half of the year), 39.5 million pounds of supply were launched in Afghanistan, combining traditional means and JPADS. By November 2012, Airborne Systems had sold more than 2,500 2k-type JPADS (FireFly) and more than 250 10k-type JPADS (DragonFly) to the US government and allied countries. In February 2013, Airborne Systems entered into a contract with the United Arab Emirates (UAE), which became the largest customer of this material in the Middle East. In December 2013, Airborne Systems entered into a USD 250 million contract to supply JPADS to DoD by 2019. By December 2014, the Canadian MMIST® was already providing the SHERPA system to 25 countries, containing, according to the company website (www.mmist.ca), three configurations (load capacities in pounds: Ranger (50-700), Navigator (100-2,200) and Provider (2,200- 10,000) (JPADS..., 2015).

3 THE RESEARCH AND THE DEVELOPMENT OF THE JOINT PRECISION AIRDROP SYSTEM (JPADS) IN BRAZIL

The exploration of this material and technology were carried out based on a pilot project in the Military Engineering Institute (IME), through a master's thesis which was submitted in 2012, whose topic was the development of a system able to carry up to 50 kilograms and had no initial partnership with the national industry.

Another record of attempted development of similar launch system was made by the Army Systems Development Center in the ZL of Itaguaí, state of Rio de Janeiro, in 2011. However, at that time, the navigation system was performed by Radio Frequency Remote Control, operated by a military stationed near the ZP. This remote control option already exists as an option in all types of JPADS and its use is conditioned to the tactical situation to adopt. The prototype in question did not have a satellite navigation system or even a navigation correction, due to the actions of the layer winds, and it still needed to be launched within reach of the operator control and vision on the ground, a fact that did not contribute for proposals in favor of its acquisition or development in Brazil.

Vertical do Ponto®, a parachute plant of the Brazilian Association of Defense Material Industries (ABIMDE), expressed interest in the project. However, the costs, the possible commercial viability and the acquisition by the Brazilian Armed Forces in an unfavorable scenario regarding the growth of the economy under incentives to IND suffered the impacts of contingency of resources for the Defense, since they did not stimulate or justify investments in that opportunity, a fact that made and still makes the conception of the project momentary and economically unfeasible.

This scenario is unfavorable as a possible national development of military equipment like this has come on a market consolidated by companies that invest heavily in research and development of technology and innovation favored by the possibilities of testing in real fields of evidence in several inter and extra-continental AMBO[7] Operational Environments, a fact that in the national business scenario would consume much time and resources to make the new PRODE competitive.

Even with the advent of ABIMDE, which has distinct fiscal policy at the heart of national industries, the current Strategic Projects of the Brazilian Armed Forces do not cover investments in this area or in this technological niche. A solution would be the development in public-private partnership or between governmental institutions, as it has already happened between the Military Institute of Engineering (IME) and the Brazilian Institute of Geography and Statistics (IBGE) (ANCIÃES, 2003), IME and Petrobrás (CALDEIRA et al., 2010), in the national aviation industry under private initiative (BASTOS, 2006) or in space agencies, such as the Innovative Partnership Program (PPI) of the National Aeronautics and Space Administration (NASA)[8], listed by Vasconcellos (2008). These interdisciplinary research groups can present results and solutions when it is involved national civil and military research centers, universities and the Industrial Defense Base (BID), as well as foreign centers of excellence.

Due to budget constraints and lack of State policies for prospecting and acquisitions of PRODE subject to the approval of Pluriannual Plans that fluctuate seasonally, this development of military employment materials is compromised and restricted to the effort of a portion of society, lacking a long-term strategic vision of other political sectors and also of greater participation of society on the matter Defense.

As a temporary solution and in order not to allow the technological gap to widen in relation to other countries, the acquisition of finished products (known as shelf products) is an option, despite all the problems they have and their consequences that greatly impact the development of genuinely national products. In due course, a more effective action by the Ministry of Defense regarding the acquisition and development of PRODE, particularly the Logistics Headquarters

[7] In Brazil, these environments are materialized by the different national biomes.

[8] Special Government Agency of the United States Government.

(CHELOG/MD) could eliminate this lack, making feasible, through Law projects or planning strategic policies, adoption of measures that guarantee innovation in this sector, as well as research and prospection of PRODE and BID's survival and international projection.

4 SHORT TERM SOLUTIONS FOR THE BRAZILIAN ARMED FORCES

In order to increase the Operational Capacity of the Brazilian Armed Forces, the provisional solution was to acquire the finished product or, as it is known, a **shelf product** (SCHMIDT, 2009). A major disadvantage of acquiring this type of product from another country lies in the fact that the logistics tail of spare parts, maintenance, upgrading of software and upgrading of the parts become a major obstacle, since this equipment consists of protection devices that care for the aggregate technology and the patents invested in its development (BOUSQUET, 2008; EGNELL, 2006; HARTLEY, 2008, 2012).

It is also worth noting the contractual aspect of the inviolability of the equipment, under penalty of losing all the technical support on the equipment, a fact that causes compulsory technological dependence and financial allocation, when it comes to the equipment operation maintenance, therefore, of the Operational Capacity maintenance of the troops that use it (GLAS, HOFMANN; EBIG, 2013; RANDALL; POHLEN; HANNA, 2010). Acquisition contracts associated with performance maintenance may be a solution for the maintenance of media availability, similar to the contract signed by U.S.M.C.[9] cited on the Defense Industry Daily website (JPADS..., 2015) and according to Berkowitz et al. (2004).

In addition to all of these constraints, including the need to train specialized personnel to ensure the availability of the material (KRESS, 2002), in December 2008, EB requested an International Request for Quotation (PCI) to Manufacturers, researching acquisition costs of equipment. In December 2010, EB bought a Canadian SHERPA Ranger equipment, following an international bidding process conducted by the Brazilian Army Commission in Washington[10] (CEBW). The other Single Forces did not accompany this initiative.

4.1 Analysis of likely interoperability

The Canadian SHERPA Ranger equipment was acquired in December 2010, along with a training package for 14 military personnel, at a total cost of 390,000.00 Brazilian currency, in order to achieve new operational levels. In the meantime, the following considerations were mapped from its acquisition process based on the studies of Bradford (2011), Barcelos (2014), and interoperability concepts foreseen in the National Defense Strategy (BRASIL, 2012), until its effective start up[11]:

a) expenses involving flight hours for trainings, aircraft availability and Joint Staff with the Brazilian Air Force (FAB) and the Brazilian Navy, in order to establish Joint Requirements (RC), Basic Operational Requirements (ROB) and Operational Technical Requirements (RTO) were not previously planned;

b) time lag and lack of knowledge of this type of equipment by the Brazilian Armed Forces are attributed to these facts, with the period between the acquisition and the first launch for the homologation of employment in the country being approximately six years; and

c) the equipment arrived in Brazil in November 2011, incomplete and with outdated software, obstacles that reinforce negative aspects regarding the acquisition of **shelf products** in PRODE's worldwide market. The software update was performed in 2014 after numerous interventions with the representative company in Brazil.

Based on these three considerations, it can be inferred that the interoperability criterion imposed by the National Defense Strategy was not met and that such equipment was initially not known or required by the Navy or the Air Force, a fact that made it difficult to put it into operation. Along with this initial obstacle, once its applicability and technical characteristics were known, its possibilities of employment began to permeate the three forces.

4.2 Possibilities of employment and doctrinal aspects

The possibilities of employment of the JPADS offer increase of the operational capacities in any AMBO (JOINT..., 2015), but they also have applicability in situations of dropping of supplies to support to humanitarian actions, or even in situations of contingency of great public commotion. Among them, it can be mentioned the actions on logistic systems that are inoperative in situations of natural disasters, where the breadth and flexibility of air supply reach can be the differential to save lives or to provide minimum conditions of survival (MORELAND; JASPER, 2014).

According to Benney et al. (2009) a set that is based on launching JPADS of the ULW type by a platform

[9] United States Marine Corps, or the Marines, United States National Force.

[10] Available At: <http://cebw.org/en/>. Accessed on: 20 Jul. 2015.

[11] The author followed the process throughout the period between 2008 and the first launches in December 2014.

called PROVIDER is already under development in the United States. It is coupled with ARP, which conducts health supplies to provide relief in remote or isolated areas temporarily.

In the military field, the initial employment of intelligent airdrop stood out in Special Operations with the possibility of accomplishing the follow-up supply in High Altitude High Opening/High Altitude Low Opening techniques (HAHO/HALO), and the opening of the equipment at low altitude was gradually developed based on new experiments (McGRATH; STRONG; BENNEY, 2005). This development went on requiring new capabilities from crew members and specialists in the operation of the equipment, as well as from elements of the Special Forces, besides a high level of training and physiological adaptation to the displacements under rarefied air (BENNEY et al., 2005).

The high level of training of the specialists and pilots who plan the mission and execute the launch is justified insofar as the JPADS have the capacity to be launched within 30 kilometers of the ZP, a situation that favors their use in support of troops of this nature.

In the support of regular troops, the system also favors the in-flight protection of the crew and the aircraft, since the low altitude would be vulnerable to the action of the enemy's antiaircraft artillery or actions of insurgents, and also allowing the multiple launching of containers or platforms with multiple destinations with only one unit of control and mission planning (BENNEY et al., 2005).

The use of the equipment in polar regions is also feasible and allows the arrival of materials safely in regions where land access or even a landing situation is not feasible at certain times of the year. As reported on the Defense Industry Daily website (JPADS..., 2015), a customized solution by a subsidiary of Airborne Systems was developed to launch containers in the Arctic. In view of this, such a solution could be feasible in the application in the logistic support to the Brazilian Antarctic Program (PROANTAR)[12].

Due to the characteristics of the equipment, some types of cargo can be launched in remote parts of the Amazon, as their approach in the spiral ZP allows the landing in isolated clearings, where hardly any means of terrestrial, fluvial or air transportation would arrive.

Dropping at sea or in rivers should be considered regardless of which Single Force will plan or execute the operation, putting together or not floating equipment or platforms, or hidropallets, due to the interoperability and complex scenarios in which the Brazilian Armed Forces can act (EGNELL, 2006; MORELAND, 2014). The Brazilian Navy has not yet considered the use of such equipment, but the reason was not identified in this study.

Another factor that favors such assertions is that the equipment navigates independently of the climatic conditions after the launch of the aircraft, in function of its previous programming, a fact that increases the possibilities of action under adverse conditions, in which the arrival of military teams to the critical point would take time, including in support of governmental and non-governmental agencies (ONG) (BRASIL, 2012).

4.3 Tests and use of SHERPA equipment purchased by Brazil

In order to carry out the test, the military personnel (instructors) had to travel to Campo Grande Air Base (BACG), Mato Grosso do Sul, in order to be supported by the 1st Squadron of the 15th Aviation Group (1º/15º GAV), designated by the V FAE[13] for the fulfillment of this material testing mission.

Five Specialists and six Auxiliaries of Folding, Parachute Maintenance and Air Supply (DoMPSA) of the Special Operations Command (COpEsp), headquartered in Goiânia, central region of Brazil, graduated from Penha Brasil General Parachute Education Center (CIPGPB), of the Parachute Infantry Brigade, were assigned to accompany and execute the training in Campo Grande.

The theoretical and planning training was conducted in three days with the specialists, and the dropping briefing was conducted at the end of the third day under the supervision of two Canadian representatives, an engineer and a former special operation military.

As the doctrine for employment and adjustments to test the full potential of the material had not been developed and homologated in time, the dropping took place only in two days, in order to meet the safety requirements imposed by FAB, although the possibilities of exploiting employment hypotheses in the presence of the Canadian engineer and technician were much greater.

The characteristics of that equipment acquired by EB are: minimum capacity of 50 pounds and maximum of 700 pounds of load, dropping between 4,000 and 25,000 feet of altitude and launching distance of up to 20 kilometers from the ZP.

According to the aforementioned, the full range of employment possibilities to be tested was suppressed

[12] Brazilian Scientific Project with logistical support operated by the Navy.

[13] V FAE or 5th Air Force is the Air Unit with headquarters in the city of Rio de Janeiro, responsible for transportation units, refueling in flight (REVO), launching of parachutists and support to Army units. The air units are the military organizations that gather the operational means of the force and each unit has a specific function, besides aircraft, personnel and facilities that assure their operation.

for safety reasons, with the launch at 6,000 and 7,000 feet (first and second day) being restricted, with safe ballistic trajectories in case of failures, graphically outlined and represented by the Google Earth program in ZL/ZP terrain ellipses and adjacencies. In the meantime, MMIST® has been supervised for mission planning processes and Launch PADS® (planning software) systems, as well as monitoring and supervision in the preparation of loads and launching.

The system fulfilled the proposed mission, focusing on the crash site with 60 meters of error in the first and 40 meters in the second launching, with the total loading weights being 550 pounds and 470 pounds, respectively.

The ZL for equipment of this size, according to USAF criteria (UNITED STATES, 2007, p.11-12), is 200 meters long by 300 wide, but for safety and criteria established by FAB, one of the dimensions used was five times higher.

Still in the first launching, five free-flight military parachutists left the aircraft in flight with the intention of commanding their individual parachutes in free fall and following the load that would guide the displacement, since the use of this category of equipment allowed such an accompaniment, even though the parachute canopy is the Parachute de France® model BT-350, different from the original equipment canopy of MMIST®. However, even though there was no similarity among the canopies, the effectiveness of the guidance and navigation to the planned point was proven.

5 CONCLUSION

The national initiatives listed in the scope for the development of an indigenous JPADS show the lack of a specific policy for the sector of innovation, prospecting and development in this area of defense materials, as well as a state support gap in obtaining PRODE that guarantee strategic or operational advantage for the Armed Forces in the employment in their missions, given the recent employment of this equipment in some conflicts, as well as the technological and dissuasive level of the nations that hold them over the others. In addition, the disengagement or inexpressiveness of the Brazilian BID is evidenced in this area.

Experience in the acquisition of SHERPA Ranger, an imported PRODE, demonstrates the mishaps and vulnerabilities in the development and maintenance of levels of operational capacity of the Brazilian Armed Forces, evidenced by the time of application of the equipment in conflicts – a fact already consolidated by other countries – by the lack of communication between the PRODE acquisition sectors of the Brazilian Armed Forces and by the difficulty of managing the acquisitions processes developed at the heart of these institutions, in this case explained by the time lag between the acquisition and the viability of its effective operation.

The need for interoperability among Brazilian Armed Forces is a prerequisite for the integration of projects and processes with a view to high levels of training and military synergy. The consolidation of the research, development, acquisition and innovation policies for the PRODE by the Logistics Department of the Ministry of Defense can be a viable solution to obtain homogeneity in future purchases for the Armed Forces.

The evolution of the JPADS places prominence in the use of transport aviation, which allows the projection of air power in any part of the national or international territory, giving the necessary support to the ground operations, as exemplified during the United States' performance in ISAF.

With the use of this equipment, there is an opportunity to improve the interoperability culture between FAB and EB, the latter being represented by a fraction of specialists qualified by the DoMPSA Battalion, stationed in the Parachute Infantry Brigade and in the Special Operations Command.

A new demand arises, the need to formulate a Brazilian Employment Doctrine for JPADS in a new multidimensional scenario, under which Special Operations, Information Operations, Government Support Operations and the use of pre-positioning techniques of supplies or material for land or sea dismissal or evacuation of personnel, in support for humanitarian actions (people stranded by natural disasters or in insurgent-dominated areas) or in support of inhospitable regions such as Antarctica are the new challenges for the preparation and employment of the Armed Forces.

Finally, continuous training, coupled with the acquisition of new equipment with other variables (weight, size, platforms), as well as the high degree of qualification required for EB and FAB operators are constraints for the value of investments and the maintenance of the new joint precision airdrop system operative capacity to be guaranteed, without which any future doctrinal evolution with new systems will be compromised.

The result of these questions may open new fronts of study in various fields of knowledge, lacking discussion in the areas of Defense and Science and Technology, as a consequence of the objective proposed in this study, which is to analyze the possibilities of employment of this system by the Armed Forces in and their potential development by a Strategic Defense Company (EED).

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