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Activity-based Calculation Models for the Brazilian Air Force Cellular Unit of Intendancy

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ACTIVITY-BASED CALCULATION MODELS FOR THE BRAZILIAN AIR FORCE CELLULAR UNIT OF INTENDANCY

THESIS

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Approved:

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Abstract

During a military operation, besides providing technological infrastructure and specific weapons, it is also essential to have physical logistics to support the basic needs of troops. To provide this specific care, the Brazilian Air Force (BAF) has the Cellular Unit of Intendancy (CUI). Annually several support operations are planned, and events that cannot be predicted are estimated. Currently, the estimated budget and the report of total costs calculated after missions do not reflect the reality of the CUI expenses. The estimated budget presents values much lower than those presented in the reports of total costs, prepared after finishing each support event, and the report of total costs covers only a few activities performed in each support event. This gives the decision makers the erroneous impression that there are sufficient resources for accomplishing all objectives established.

The Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems were used in this research to generate the ABC and ABB models of calculation that will allow planners (officers) to provide more precise estimates of budgets and more accurate reports of total costs, based on the cost of the activities performed in each support event. These models will allow the decision makers to better plan the financial applications for the CUIs and to have more control of the existing resources. With this, the CUIs will be able to provide with excellence all activities needed to maintain the well-being and the morale of the troops deployed and, consequently, help to improve the overall results of the BAF missions.

To my family.

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First of all, I would like to thank God for my life, my parents for encouraging me during my whole life, and the Brazilian Air force for this wonderful opportunity. A heartfelt appreciation is reserved for my beloved partner in life, my husband, who assumed extra heavy burdens this past year so that I could focus on my studies and research. Without his support, I would fall short every time. I would like to ask my little son to forgive me for not giving him all my attention during the pregnancy and his first 6 months of life. His smile made and makes all my effort worth it.

This research effort was successful due to the support and contributions given by my research advisor and research reader. I would like to express my sincere appreciation to my advisor, Lt Col Bradley Anderson for his mentoring, direction, and encouragement throughout the course of this thesis research. His insight and mentorship throughout this program kept me motivated and focused. I would, also, like to thank Dr. Cunningham for agreeing to be my reader and for being such an outstanding professor. Both Lt Col Anderson and Dr. Cunningham have been extremely patient in understanding my research topic and problem, and in helping me to build the models to address them.

I am forever in debt to my friends and experts in the CUI for answering the Delphi surveys; Mrs. Robb, International Military Student Officer, for encouraging me during this course; and Mr. Victor for reviewing my work. Their experience and observations were most certainly appreciated.

Paula Ferreira da Silva

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FOR THE BRAZILIAN AIR FORCE CELLULAR UNIT OF INTENDANCY

I. Introduction

1.1 Background

According to Braz (2004), the current battlefield is fluid and dynamic. The concentration of trained personnel and suitable material in the right place at the right time ensures the power of combat is superior to the opponent. The perfect synchronization of actions of the operating systems guides the events on the battlefield, and this can be used to reduce the surprises of combat.

Alert to this evolution of the battlefield, the Brazilian Air Force (BAF) has been improving its doctrine and modernizing its weapons systems and organizations to ensure, even in peacetime, the provision of necessary resources to sustain the fight and support the warfighter. In this context, special attention has been given to the psychological and material needs of the troops deployed, in an attempt to create a camp with the most comfortable possible infrastructure behind the battle line. This encourages physical and mental recovery, allowing the soldiers to return for another day of activities totally focused on accomplishing the mission.

However, maintaining the morale and determination of the troops under adverse conditions does not arise spontaneously. So, it is important to develop a strong policy of action during peace time in order to prepare the troops for combat, by recognizing actions for the well-being and maintenance of morale and also supplying activities that sustain them.

1.1.1 Logistic Support for the Basic Needs of Troops Deployed in the Brazilian Air Force.

"The first idea that comes to people's minds when they think about a military camp in remote areas is a place full of privations, with cold showers, sleeping bags and cold food, packaged in ration packs. With hard work and technology the reality of a military camp has distanced itself from this common image. Today you can find comfort in the structures assembled kilometers from any cities, either in the Amazon rainforest or in the South Mountains or anywhere else in the country. Hot baths, air conditioned environments, varied menus, laundry, phone, internet and even a big screen which displays shows and movies offer conditions for the military to counter the hard routine of their missions" (www.fab.mil.br/portal, 08/04/2011).

In the Brazilian Air Force, the activities mentioned in the above excerpt are developed by the Cellular Unit of Intendancy (CUI). The CUI supports air units deployed and their Mobile Support Echelon (MSE) (up to 250 military) in remote locations or with deficiency of resources, whether in training or actual operations (MMA400-3, 1976). The CUIs are responsible for various activities in an MSE, including: shelter (air-conditioned accommodations), recovery (providing meals), consumable item, hygiene (showers and toilets), and laundry.

One important mission of the Cellular Unit of Intendancy was during the Operation "Goal 2006", to rescue 154 crash victims of a Boeing 737 of the company Gol Air Lines in the Amazon Rainforest. The team of military PARA-SAR (Airborne Rescue Squadron), responsible for collecting the bodies, received shelter and food support from a Cellular Unit of Intendancy (Abrahao, 2007).

"Until the arrival of the CUI, we were sleeping on the floor, on the balcony of Jarina farm, and eating operational rations. It was not easy to spend all day in the jungle, recovering pieces of dead people and not have the minimum conditions of rest to recover for the next day. After the CUI came with beds, food, showers and clean uniforms, the will to accomplish the mission started to shine again in the eyes of all of us.", said the PARASAR Team Coordinator, Infantry Captain Lubas (Report of Operation" Goal 2006").

"The heat was very intense, and by noon we expected the helicopter to bring meals and especially ice water. On the day when for some reason the helicopter did not appear, the number of bodies recovered was smaller.", reported one of the PARASAR team members, Sergeant Marcelo. (Report of Operation "Goal 2006")

Another operation relevant to the CUI was support to the military of the Field Hospital. At that time support was provided to the victims of the floods in the State of Santa Catarina in 2008. The following report illustrates the vital importance of the CUI in accomplishing the mission:

In Santa Catarina, CUI took only 10 hours to assemble the MSE. For the health care team to work with tranquility and comfort, twelve other military took care of every detail. Meals, air-conditioned accommodations, transportation, laundry, everything was arranged by the CUI which has as its primary mission to ensure the well-being of the troops. Small gestures made the difference in the journey of more than ten hours of work: "hot chocolate on cold and rainy afternoons, pasta at lunch and cake for the birthdays are examples of care that made our day-to-day activities more enjoyable, "said the Coordinator of the Field Hospital, Lieutenant Colonel Medico Camerine. (www.agenciaforcaaerea.aer.mil.br, 12/22/2008)

Several other operations were successfully supported by the CUI. Among them, medical care for the needy population in different parts of the country (Operations “ACISO”), training for operational readiness (Operations “Aghata” and “Cruzex”), humanitarian missions (support to combat dengue in the city of Rio de Janeiro; support of the military recovering bodies and airplane parts from the accident of an Air France airplane, support for the military involved in the care of the victims of the earthquake in Haiti). At all these events, the CUI has demonstrated the efficiency and effectiveness of its working methods, tactics and operating procedures providing logistical support to keep the well-being and morale of troops.

1.2 Problem Statement

During a military operation, besides providing technological infrastructure and specific weapons, it is also essential to have physical logistics to support the basic needs of troops such as food, housing and toilets. To provide this specific care, the Brazilian Air Force has the Cellular Unit of Intendancy, formed by people and materials necessary to sustain an Air Unit consisting of up to 250 military. The CUI utilizes a mobile camp where several activities can be performed to provide all the basic needs to the troops deployed during an operation, real or in training. To assemble a camp, it is necessary to plan, execute and control various activities during all stages of a military operation. These activities are related and the expenses associated with each one of them contribute to the total costs of each support activity performed.

Annually several support operations are planned, and events that cannot be predicted (floods, for example) are estimated. However, with frequent budget cuts, there is no material or financial resources sufficient to meet the planning requirements. It is necessary to prioritize which support activities will be carried out based on the cost of each one of them. Therefore, submission of an accurate budget and a correct report of total costs becomes vitally important to support the decision making process.

Currently, the estimated budget and the report of total costs for the support of the basic needs of the fighters from a military unit deployed do not reflect the reality of the CUI expenses. The estimated budget presents values much lower than those presented in the reports of total costs, prepared after finishing each support event, and the report of total costs covers only a few activities performed in each support event. This fact gives

the decision makers the erroneous impression that there are sufficient resources for accomplishing all objectives established.

Planners (officers) must be able to provide more precise estimates of budgets and more accurate reports of total costs, based on the cost of the activities performed in each support event. To do so, they must be able to track all activities and tasks that add cost to the process and evaluate the costs incurred in each support event.

1.3 Research Focus

The main objective of this research paper is to develop models that provide the officers with a more accurate way to calculate the following:

1.The total costs of each support performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support); and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

This study will also discuss potential future applications of these models as well as recommendations about their use in future deployments.

1.4 Research Questions

To address the objective of this research, some questions need to be answered. The Research Questions in this study are divided into Primary and Subsidiary Research Questions.

The Primary Research Question is divided into two parts:

1.How to calculate the total costs of each support activity performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for support; and

2.How to estimate the budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

The Subsidiary Research Questions are:

1.What are the phases, activities and tasks that need to be performed to support the basic needs of the troops during a deployment?

2.What are the activities, tasks and their related cost drivers that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support)?

3.Which phases, activities, tasks and related resource drivers need to be included in the calculation of the budget in order to reduce the difference between the value forecasted and the real value spent, calculated after the mission?

4.What is the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of the troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip)?

1.5 Methodology

According to Ellram (1996), the research methodology or basic research design can be classified, according to the type of analysis, into primarily quantitative or qualitative.

Thus, the data used in this research is going to be primarily qualitative, and it will be collected using the Delphi Method. This method relies on the expert opinions of experts in CUI support operations. Due to the qualitative nature of this study, the Delphi approach was selected as the most appropriate means of gaining expert insight into the process.

The Delphi Method aimed to answer the Subsidiary Research Questions. The result of this analysis was used in the implementation of the Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems. These systems were used to create the models that provided the answers to the Primary Research Question.

The final step in the methodology of this research was to demonstrate the applicability of the models by applying them to a real support of CUI.

1.6 Assumptions

Assumptions in this research are:

1.It is not necessary to buy permanent material to perform support for any deployment. Each unit of logistic support has all those items in its inventory;

2.The Cellular Unit of Intendancy responsible to sustain an operation is the one located closer to the mission site;

3.Once the activities begin, the Air Base, headquarters of the Cellular Unit of Intendancy responsible for the support will send resupplies to the camp, if necessary;

4.All other CUIs can support the CUI responsible for the support with equipment, material and manpower, if necessary.

1.7 Limitations

Limitations of this study are:

1.The dynamic nature of the basic needs of the troops due to different conditions of environment, length of mission, number of military units involved, transportation, and supply chain can create difficulties in finding a precise and unique way to calculate a budget for all kinds of operations. Therefore, a standard deployment (support up to 250 soldiers during 15 days with resupply, in a site close to a high-way or airstrip) will be used;

2.The phases, activities and tasks that need to be considered in calculating the budget and the total costs are not specified in the existing literature on logistic support in Brazil. This research will rely on the experience of experts and on the knowledge acquired by them during past operations;

3.This research does not evaluate the total costs of operations (expenses associated with the specific missions performed by the Air Units during the deployments, for example air activities, hospital activities, use of weapons, etc). Those costs are tracked for each Air Unit specifically;

4. This study only analyzes elements related to the logistics cost of personnel support (expenses linked to the support of the basic needs of Brazilian Air Force personnel during deployments). The calculation of budgets and costs will entail only the activities under the responsibility of the CUI, specified in the Manual of CUI (MMA 400-3/1976), namely:

a) finance;
b) providing supplies, classes: I-Material of Subsistence, II- Intendancy Material, III-Fuels and lubricants, IV- Construction Material, VI- Engineering and Cartography Material, and X-Material not included in other classes;
c) providing consumable items;
d) surface transportation;
e) laundry service;
f) providing manpower;
g) assembly, disassembly and maintenance of the camp;
h) providing meals;
i) exploration of local resources;
j) controlling excess material;
l) collecting the material captured from the enemy;
m) repair and maintenance of intendancy material;
n) loading and unloading of material;
o) cleaning and preparation of the terrain;
p) collecting, grouping and evacuation of salvage;
q) burial and assets;
r) postal delivery;
s) recreational facilities;
t) bath, disinfection, sanitary and barber shop;
u) water supply;
v) water treatment;
x) providing electrical power.

1.8 Organization

This research will be organized in the following manner:

Chapter 1 presents the background of the study and outlines research objectives and problem, methodology and limitations.

Chapter 2 outlines the conceptual foundation with a literature review, building the basis for an understanding of the CUI, its process and activities; the Activity-Based Costing and the Activity-Based Budget Systems; and the Delphi Method.

Chapter 3 gives special attention to applying the methodologies that were used in this research. The Delphi Method was used to collect the data necessary for all analysis performed in this study.

Chapter 4 analyzes the results obtained by the application of the models developed in this study in an attempt to solve the problem and answer the Research Questions previously stated.

Conclusions and future recommendations about the use of the models developed in future deployments are addressed in Chapter 5.

The models to be developed with this study will allow planners (officers) to provide more precise estimates of budgets and more accurate reports of total costs, based on the cost of the activities performed in each support event. With this, the decision makers will be able to better plan the financial applications for the CUIs and to have more control of the existing resources. They will also be able to better define what support missions the CUIs will perform or not when the resources are short or some contingency is taken place, based on each estimate of the budget. The CUIs will be able to provide with excellence all activities needed to maintain the well-being and the morale of the troops deployed and, consequently, help to improve the overall results of the BAF missions.

II. Literature Review

In this study, the literature review will include three areas:

1) Logistics support personnel - Brazilian Air Force;
2) Use of resources and measure of performance (ABC and ABB systems);
3) Identification of process activities (Delphi Method).

The first section contains background information on how the Brazilian Air Force provides logistical support for the basic needs of military units deployed and pertinent information (analysis of historical data) about how the reports of total costs and budgets for support events have been calculated in the past. This section aims to deepen the understanding of the reader for the problem to be analyzed in this study.

The second section of this chapter presents the ABC and the ABB systems. It will describe their characteristics, benefits, steps of implementation, and the relationship between them. These tools will provide means to answer the Primary Research Question (How to calculate the total cost of each support activity performed and how to estimate the budget necessary to support the basic needs of the fighters deployed?).

The third and last section of this chapter presents the Delphi Method and how it works. This Method was used to answer the Subsidiary Research Questions. It was also used as the methodology to collect the basic information to implement the ABC and the ABC systems.

2.1 Logistical Support of Personnel - Brazilian Air Force

In the last decade, the Brazilian Air Force has been assigned with missions that extend its domain, for example, assistance actions in situations of disaster and calamity. In these missions, only the military had the capacity to deal with the situation. Due to the

success obtained in these activities, the frequency with which the BAF has been requested has increased exponentialy.

In the BAF, the logistics support to military contingent units deployed to meet various missions predicted is performed through Cellular Units (CU). They are mobile and modular logistical support structures deployed to the area of operation (theater of operations: Air Bases, sites of disasters, accidents and others). In this context, the Cellular Units have acquired a prominent place in solving problems of logistical support and have become an important factor in the course of military operations.

The focus of this study, the Cellular Unit of Intendancy is intended to provide logistical support to the basic needs of troops deployed, including all activities necessary to keep the well-being and morale of the soldiers. This meets, among other accomplishments, the duties of lodging and effective recovery (accommodations), food, providing sanitary facilities (shower and toilets), recreation, and water and electricity supply.

2.1.1 Cellular Unit of Intendancy.

The CUI provides the Air Force with the necessary mobility to support the basic needs of deployed military units in places without basic infrastructure.

CUI assignments involve any apparatus required for troops support, according to the doctrinal definition of the *Cellular Unit of Intendancy Manual* (MMA400-3/1976):

"The Cellular Unit of Intendancy is the unit formed by the personnel, material and equipment required to support, with specific logistics services, a squadron-level Air Unit and its Mobile Support Echelon (MSE) (up to 250 military), when operating outside of its headquarters" (Figure 1).

Figure 1. Mobile Support Echelon (MSE) – Operation "Mineirinho II". (www.aer.mil.br)

The CUI must then provide personnel, material and equipment to support the MSE. It is also responsible for all material in common use by any other Cellular Unit component of the MSE, namely Cellular Units of Health, Engineering, Safety and Defense, Maintenance, War Material and Photo Interpretation. Currently in the BAF there are eight CUIs in operation. Six are operational (based in Air Bases). One is used to develop and test new equipment (based in the Central Depot of Intendancy). One is used for basic military training (based in the Air Force Academy).

According to the MMA 400-3/1976, the logistical support provided by the CUI shall cover the following activities:

a) finance;
b) provision of supplies class I-Material of Subsistence, II- Intendancy Material III- Fuels and lubricants, IV- Construction Material, VI- Engineering and Cartography Material, and X-Material not included in other classes;
c) providing consumable items;
d) surface transportation (Figure 2);
e) laundry service;
f) providing manpower (Figure 3);
g) assembly, disassembly and maintenance of the camp (Figure 4);
h) providing meals (Figure 5);
i) exploration of local resources;
j) controlling excess material;
l) collecting the material captured from the enemy;
m) repair and maintenance of intendancy material;
n) loading and unloading of material (Figure 6);
o) cleaning and preparation of the terrain;
p) collecting, grouping and evacuation of salvage;
q) burial and assets;
r) postal delivery;
s) recreational facilities (Figure 7);
t) bath, disinfection, sanitary and barber shop (Figure 8);
u) water supply;
v) water treatment;
x) providing electrical power.

Figure 2. Surface Transportation. (www.aer.mil.br)

Figure 3. Providing Manpower. (www.aer.mil.br)

Figure 4. Assembly, Disassembly and Maintenance of the Camp. (www.aer.mil.br)

Figure 5. Providing Meals. (www.fab.gov.br)

Figure 6. Loading and Unloading of Material. (www.fab.gov.br)

Figure 7. Recreational Facilities – Gym. (www.fab.gov.br)

Figure 8. Bath, Disinfection, Sanitary. (www.fab.gov.br)

The CUI can be employed in the following situations:

a) Logistical support for the military during Air Operations, for real job or training (Figure 9);
b) Missions of mercy (Figure 10);
c) Interoperability with other Armed Forces (Figure 11);
d) Humanitarian Missions (Figure 12);
e) Support to the missions of the Field Hospital (Figure 13);
f) Training of the Infantry of Aeronautics;
g) Training Operations for the troops;
h) In expanding the capacity of an Air Base or Aeronautical Detachment in a situation of readiness (or training);
i) Basic training for students of military educational institutions.

Figure 9. Operation “Mineirinho VI”. (www.fab.mil.br)

Figure 10. Operation “Itaipava 2010”. (www.fab.mil.br)

Figure 11. Operation “Aghata VI” –Air Force and Army. (www.fab.mil.br)

Figure 12. Operation “Haiti”. (www.fab.mil.br)

Figure 13. Operation “ACISO BH 2011”.
(www.fab.mil.br)

To be able to work at a CUI it is necessary for planners (officers) and operators (sergeants) to take a CUI preparation course. All those who successfully complete the course have their names included in a database where the information about their performance in all support activities is recorded. All military members that have their names in the database can be selected to perform a support event and contribute to its excellence. However, excellence in the provision of service does not depend only on a good team of planners and operators. It depends also and principally on the existence of financial resources to cover all support events requested.

Currently, the budget established to cover the expenses of those events has considered only major expenses, food and personnel payment. With this, the standard of excellence necessary is hardly reached, and the total amount of expenditure, calculated at the end of each support, always exceeds the budgeted amount. After each support event a report of total cost is prepared, which analyzes 11 activities. However, more actions that add costs to the process are being executed, but they are not being included in the final report.

2.1.1.1 How are the CUI Costs Calculated Currently?

Currently, the CUI missions are authorized after the budget related to each support event is analyzed. The budget for every mission is required two years in advance and, if there are resources available in the year corresponding to the execution of the mission, then support is authorized. Those budgets provide information only on expenses related to feeding and personnel payment (the increment in salaries only for planners and operators of the CUI). At the end of each operation, all expenses are recorded and totaled. Not surprisingly, the total costs of the support event exceed the value presented in the initial estimate of expenditure. The report of total costs analyzes only 11 activities. However, many other expenses occur before, during and after the deployment and they are not being considered.

Data of the Summary Report of Budget and Costs (summary of budget and costs of support of personnel between 2006 and 2011) provided by the headquarters of the CUIs, the Division of Operational Intendancy, in 2012 was analyzed. It was possible to observe that the cost after each mission is by far over the budget for all missions evaluated (Table 1/Figure 14).

Table 1. Summary of Budget and Total Costs (per Mission) between 2006 and 2011 (Division of Operational Intendancy, 2012)

YEAR	MISSION	BUDGET (TOTAL PER MISSION)	COST AFTER MISSION (TOTAL PER MISSION)	VALUE OVER BUDGET	% OVER BUDGET
2006	ACISO	R$ 67,205.80	R$ 127,242.89	R$ 60,037.09	89.33%
	TRAINNING OF OFFICERS	R$ 136,575.00	R$ 205,601.95	R$ 69,026.95	50.54%
	TRAINNING OF SERGEANTS	R$ 26,734.00	R$ 84,386.58	R$ 57,652.58	215.65%
	TRAINNING OF OFFICERS	R$ 31,547.20	R$ 88,936.84	R$ 57,389.64	181.92%

2007	TRAINNING OF OFFICERS	R$ 217,313.50	R$ 370,378.51	R$ 153,065.01	70.44%
	TRAINNING OF SERGEANTS	R$ 26,734.00	R$ 84,702.57	R$ 57,968.57	216.83%
	TRAINNING OF STUDENTS	R$ 26,734.00	R$ 85,977.71	R$ 59,243.71	221.60%
2008	TRAINNING OF OFFICERS	R$ 216,023.50	R$ 367,523.61	R$ 151,500.11	70.13%
	TRAINNING OF SERGEANTS	R$ 26,734.00	R$ 85,165.16	R$ 58,431.16	218.56%
	TRAINNING OF STUDENTS	R$ 26,734.00	R$ 86,340.30	R$ 59,606.30	222.96%
	FLOOD IN SANTA CATARINA	R$ 110,250.00	R$ 160,235.32	R$ 49,985.32	45.34%
	CRUZEX	R$ 259,495.00	R$ 371,926.97	R$ 112,431.97	43.33%
2009	TRAINNING OF OFFICERS	R$ 176,270.00	R$ 328,543.59	R$ 152,273.59	86.39%
	TRAINNING OF SERGEANTS	R$ 26,734.00	R$ 85,433.89	R$ 58,699.89	219.57%
	TRAINNING OF STUDENTS	R$ 46,789.00	R$ 86,475.61	R$ 39,686.61	84.82%
	FLOOD IN RECIFE	R$ 61,422.20	R$ 146,713.08	R$ 85,290.88	138.86%
2010	ACISO	R$ 21,004.58	R$ 83,406.95	R$ 62,402.37	297.09%
	TRAINNING OF OFFICERS	R$ 82,424.96	R$ 236,366.50	R$ 153,941.54	186.77%
	EARTHQUAKE IN HAITI	R$ 651,071.08	R$ 815,684.32	R$ 164,613.24	25.28%
2011	ACISO	R$ 18,016.34	R$ 80,673.30	R$ 62,656.96	347.78%
	FLOOD IN ITAIPAVA	R$ 37,999.30	R$ 137,904.44	R$ 99,905.14	262.91%
	TRAINNING OF OFFICERS	R$ 77,652.72	R$ 272,180.16	R$ 194,527.44	250.51%
	TRAINNING OF SERGEANTS	R$ 7,410.48	R$ 67,799.75	R$ 60,389.27	814.92%

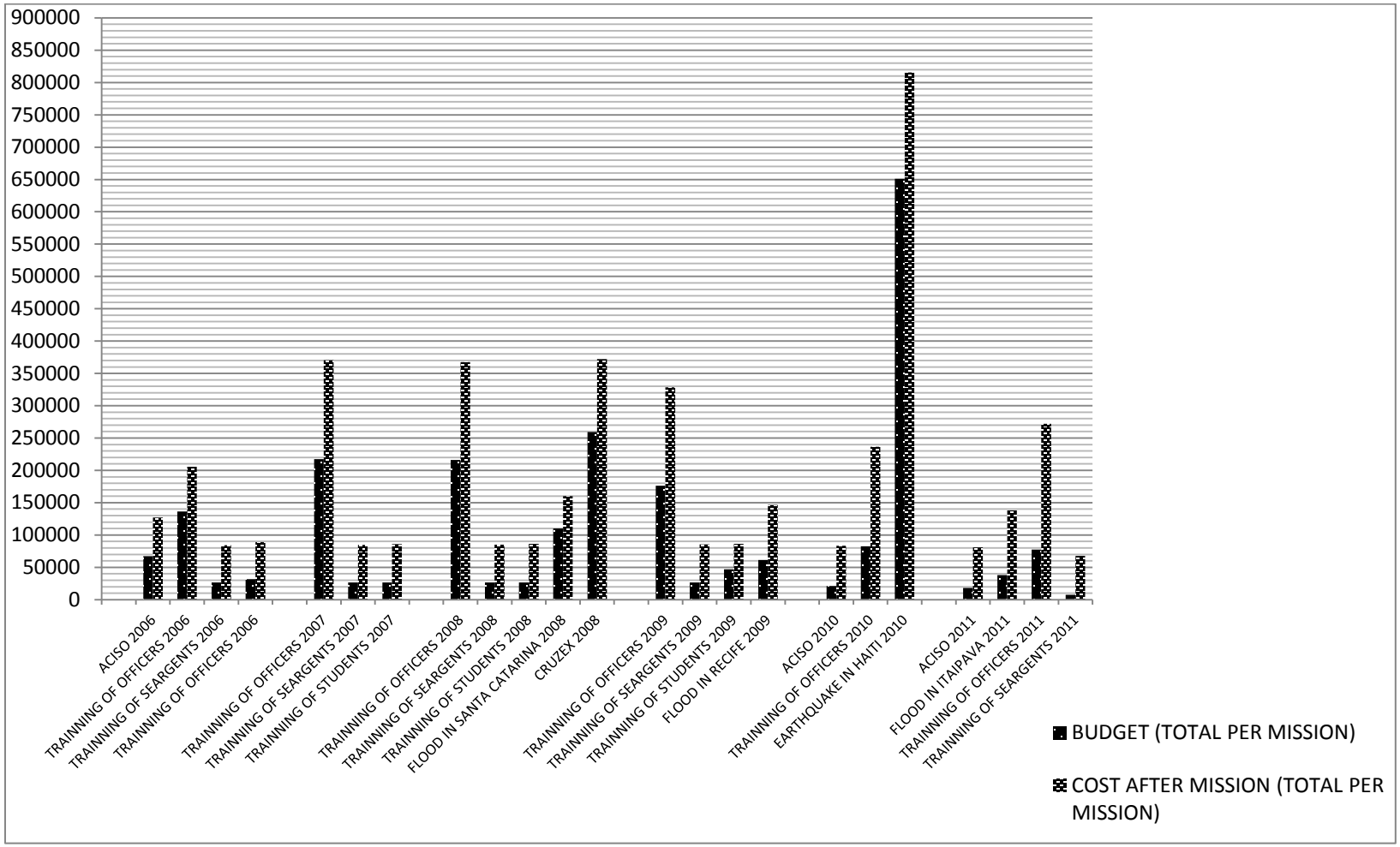


Figure 14. Graph Comparing Budget and Total Costs (per Mission) between 2006 and 2011. (Division of Operational Intendancy, 2012)

The difference between the values presented in the budgets and those achieved after missions, as well as the incompleteness of the reports of total costs, show the resources available annually to be insufficient to carry out all missions planned. With this, it is possible to perform only some of them or they are performed only partially, compromising the quality of service provided to troops.

The same values analyzed previously were grouped by years (Table 2/ Figure 15). It showed how the discrepancies behaved annually between 2006 and 2011. The values budgeted were much smaller than the total costs in all years analyzed.

Table 2. Summary of Budget and Total Costs (per Year) between 2006 and 2011 (Division of Operational Intendancy, 2012)

MISSION	BUDGET	COST AFTER MISSION	VALUE OVER BUDGET	% OVER BUDGET
TOTAL PER YEAR 2006	R$ 262,062.00	R$ 506,168.26	R$ 244,106.26	93.15%
TOTAL PER YEAR 2007	R$ 270,781.50	R$ 541,058.79	R$ 270,277.29	99.81%
TOTAL PER YEAR 2008	R$ 639,236.50	R$ 1,071,191.36	R$ 431,954.86	67.57%
TOTAL PER YEAR 2009	R$ 311,215.20	R$ 647,166.17	R$ 335,950.97	107.95%
TOTAL PER YEAR 2010	R$ 754,500.62	R$ 1,135,457.77	R$ 380,957.15	50.49%
TOTAL PER YEAR 2011	R$ 141,078.84	R$ 558,557.65	R$ 417,478.81	295.92%

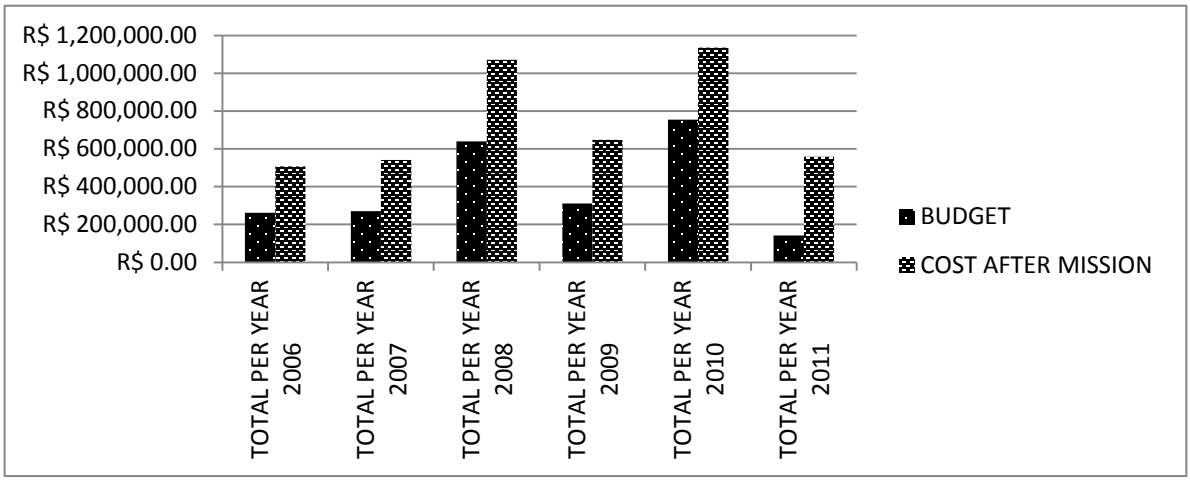


Figure 15. Graph Comparing Budget and Total Costs (per Year) between 2006 and 2011. (Division of Operational Intendancy,2012)

With the reduction of the resources available annually, it is necessary that administrators are able to calculate the logistical costs to support the basic needs of personnel during deployments and prepare more accurate budgets. This will allow resources to be applied in the best way possible. It will also permit the evaluation of the performance of the entire process. Therewith the operations may be carried out in accordance with the annual goals set, and excellent service can be provided to all military involved.

2.2 Use of Resources and Measure of Performance

One of the biggest challenges for the public organizations, among them military organizations, is the proper use of financial and material means. The managers need to make the resources available sufficient to cover the demand. However, the national situation of scarce resources makes the accomplishment of the goals even more difficult.

The implementation of the budget of the Union in recent years shows a significant reduction in spending on the Ministry of Defense.

> "Of the R$ 50 billion budget cut, announced by the Government for 2011, R$ 4,024 billion will affect the Ministry of Defense. The Defense Minister, Nelson Jobim, stated that the value corresponds to a reduction of 26.5% compared to the total amount estimated of R$ 15.16 billion." (www.estadao.com.br, 2/15/2011)

> "The Ministries of Health, Cities, and Defense were the most affected by the cut of R$ 55 billion in the Union's General Budget [...] On Defense, the cut corresponds to R$ 3,319 billion." (economia.uol.com.br, 2/15/2012)

These budget cuts have limited administrative and operational activities of the three Armed Forces. With the goal of reducing the impact caused by these successive cuts, the Armed Forces have been seeking to systematically modernize the management of financial and material resources. The new management models adopted are oriented

toward management and evaluation of results. It requires that managers develop tools to support decision making, reduce costs and evaluate the performance of the organizations.

Because the mission or objective of nonprofit organizations, like the Armed Forces, is service rather than earnings, operating surplus (net income) may not appropriately measure success for organizations or managers. Accordingly, many nonprofit organizations use measures of expenses relative to budget as the parameter for conducting their activities.

For Kaplan and Norton (2001), businesses are increasingly being constrained by the inflexibility of the budget process. The same happens in nonprofit Organizations, since they must gather information only to fill regulatory reports. Consequently, they often base their internal accounting systems on the information required to produce those reports. Unfortunately, these reports do not provide relevant information for the wide variety of decisions that managers must make and do not assess the performance of the organization.

Thus, to properly evaluate performance, it is crucial that managers have more refined management information available than only main expenses. The total costs should be analyzed. Knowing the costs of each activity, it is possible to estimate if the available resources are sufficient to accomplish the established goals. It will also permit addressing the main objectives of this research paper, which are to provide a more accurate way to calculate:

1. The total costs of each support activity performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for support; and

2. The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

2.2.1 Calculation of Costs.

An integrated approach to calculating total costs and to estimating the budget will allow this logistic process to be seen as a conduit of interrelated activities, minimizing the discrepancies between values budgeted and reports of total costs and making the reports of total costs more complete. In this type of approach, the analysis of expenses for technical activities will not be done for each task individually. They will consider the whole process in which they are inserted and the interdependence that exists between them. Thus, the cost to perform logistics support events for the basic needs of troops deployed and the budgets to perform them will be better calculated.

2.2.1.1 Activity-Based Costing (ABC).

According to Kaplan and Cooper (1997), Activity Based Costing (ABC) is a technique to assess more accurately the costs of activities performed by an organization, based on the consumption of resources used. This methodology has been shown as the most appropriate approach for calculation of costs. Data generated with ABC can also be used for an evaluation of the activities and, consequently, of the processes. With this the processes can be redrawn and resized, canceling or improving some activities.

> "Improving the performance of public administration is a need that has been evidenced in this decade. First, the default of Brazil's insertion into the world economy requires better public sector performance, given the systemic nature of competitiveness. Second, the State's fiscal crisis requires the Government to do more with fewer resources. The proposal is that the Government develops and uses an Activity-Based Costing system (ABC), because they have the necessary flexibility of the service sector and it is a useful tool in the processes of restructuring and improving management. ABC system is superior to traditional costing methods, because: 1) it reduces distortions of allocation of costs and corrects them; and 2) it not only process costs, but it also show how and where the costs are formed, favoring a change of attitude of managers." (Magazine of Public Service, 50(1), March: 37-63)

According to Matz, Curry and Frank (1967), to analyze total spending is necessary to examine the whole functional structure and identify the various costs of the integrated framework. ABC tries to allocate overhead costs to cost objects in a manner consistent with cause and effect (Siau and Van Lindt, 1997). The major advantage of using this technique is that it avoids or minimizes distortions in product/service costing that result from arbitrary allocations of indirect costs. It assists management in developing an understanding of what causes costs to be incurred (Ellis-Newman and Robinson, 1998).

Activity-Based Costing also provides a clear metric for improvement. It encourages management to evaluate the efficiency and cost-effectiveness of activities. Some ABC systems rank activities by the degree to which they add value to the organization or its outputs. This encourages managers to identify what activities are really value-added in order to accomplish a mission. This improves decision making through better information and helps to eliminate waste by encouraging employees to look at all costs. When employees understand the activities they perform, they can better understand the costs involved.

The fundamental hypothesis of ABC is that costs are generated by the activities. As a result of mapping activities, it is possible to make a more accurate description of the way in which resources are consumed within an organization. This map identifies what activities add value to the product and which do not.

The ABC system shows how costs are formed in organizations, while traditional costing systems are limited to ascertaining the costs. Conventional cost systems focus on the product in the costing process, while ABC emphasizes the activities involved in

producing the product (Kaplan; Cooper, 1997). The usefulness of an ABC system also depends on the level of detail at which activities are defined, how much work it takes to associate costs with activities, and whether or not a typical user of the information generated is likely to interpret it correctly (Beaujon and Singhal, 1990).

According to Kaplan and Cooper (1997), four steps are necessary to implement ABC. They are:

1. Develop the Activity Dictionary: This step requires an in-depth analysis of the operating processes of each segment. It is necessary to analyze business process and identify all activities being performed.

2. Determine how much the organization is spending on each of its activities: In this step, the ABC maps from resource expenses to activities, using resource cost drivers. This is sometimes called "tracing." Traceability refers to recognize all costs to determine why they were incurred.

3. Identify the organization's products, services and customers: This step identifies all of the outputs for which activities are performed and which resources are consumed by an activity segment. Outputs can be products, services, or customers (persons or entities to whom a federal agency is required to provide goods or services).

4. Select activity cost drivers that link activity costs to the organization's products, services and customers: In this step, activity costs are assigned to outputs using activity cost drivers. They are used to link activities and cost objects, such as products, services, and customers. Activity drivers assign activity costs to outputs based on individual output's consumption or demand for activities. For example, a driver may be the number of times an activity is performed (transaction driver) or the length of time an activity is performed (duration driver).

There are two basic approaches toward implementing an ABC system. One is the top-down approach where the business processes are identified first, then the activities. The second approach is to start from the bottom by identifying activities first and then arranging them into business processes. The activities will normally be specified in detail for the departments and areas covered by the activity analysis (Miller, 1996). If the top-down approach is taken, it will ultimately require the detailed analysis at the lower level

to validate, add, delete, change, and modify the initial definitions of activities and business processes (Miller, 1996).

2.2.1.1.1 Application of the ABC Cost System in Public Organizations.

The potential of using the ABC method in organizational change processes and quality programs has been highlighted in the specialized literature:

"The best place to control costs is at the level of processes. When the control relies on a budget and accounting system of funds, many decisions are made arbitrarily. In most cases, this happens simply because the top-level managers have no idea which parts of the process add more value to products and services and which add less. Employees at the level of processes are able to determine this value, but need to have an indicator of actual cost. The Activity-Based Costing provides this type of information." (David Carr and Ian Littman, 1993)

According to Porto (2009), ABC is particularly suited to the public sector because:

1. It was designed to ascertain the costs not only of products (goods or services), as well as other cost objects: processes, projects, goals, government programs, governmental units, among others. This point is more relevant than it might seem at first glance. Traditional costing restricts the costing of products to objects. However, in many areas of the public service, it is difficult to identify precisely what is the product. This difficulty has been noted in the process surveys made in recent years in federal government agencies. The typical public sector products are generally non-homogeneous services, with a complex nature and without similar product on the market;

2. The total costs of a product are obtained by aggregation of indirect cost to direct cost. The indirect cost depends on somewhat arbitrary assessment criteria. Moreover, due to technological progress, the overhead and fixed costs are having an increasing weight in the composition of the cost total of many products, making the arbitrary setting of assessment criteria even more problematic;

3. ABC systems have a flexible architecture, particularly suited to complex organizations, with constantly changing processes, compatible with high technological standards; and

4. ABC is a powerful tool in restructuring programs and management improvement, because it not only clears the costs already incurred, but it is also particularly useful for simulating the impacts on costs coming from improvement actions or reengineering of process. In particular, the ABC guides selective expending cuts in fiscal adjustment programs, minimizing the negative impact of these programs.

2.2.1.1.2 Public Service Costs in Brazil.

Unlike the private sector, the experience with public service costs systems in Brazil are quite recent. Apart from a few isolated experiments, it can be said that there is no culture of calculation of total costs in the public service. In addition to the historic lack of motivation for the calculation of costs, there is also the inadequacy of traditional costing methods characteristic of the public service. As in traditional methods, the cost is determined by cost centers and assessment criteria. The Government could have problems with the improper choice of these two elements, compromising the institutional evaluation efforts that will be undertaken. In fact, the frequent changes in the structure of government bodies and agencies determine a redefinition of cost centers, unsettling the determination of them by the absorption costing method. On the other hand, the indirect and fixed costs are high in the public sector, making the choice of the criteria for distribution even more problematic. Thus, the ABC cost system applies better to public administration than the traditional cost systems.

If they are necessary and technically feasible, why were the costs never calculated in the public service in Brazil? The reasons are partly cultural and partly economic. Actually, at first glance, it seems unnecessary, since in public service the fundamental requirement is law enforcement. In compliance with the law, the public service is effective. Efficiency is a private concept, so foreign to the public sector. This has been the paradigm of the public sector. It is not part of their culture. This new concept requires not only meeting the law, but it also requires good performance, resources saving and satisfaction of users of services.

Historically, there is the perception that any cost of public services is covered by the indirect financing through taxes, and there is no need to justify their costs. Finally, and most importantly, public agents resist checking costs because, for them, they will have to justify their (low) performance.

However, according to Casali (1995), in Brazil, between 28% and 75% of decisions on pricing, justification of investments, sourcing, analysis of new products, management performance, changes in products and process engineering, cost accounting and market strategies are made based on cost information. For this reason, to obtain a more accurate and complete cost information, the ABC system should be used.

In the case of this research, the application of the ABC system in the CUI process leads to the development of the model to calculate the total costs of each support activity. The ABC model built is a report of total costs that group all costs incurred in the performance of logistical support activities for the basic needs of troops deployed. It also provided the answer to the first part of the Primary Research Question (How to calculate the total costs of each support event performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for the support).

2.2.2 Elaboration of Budget.

ABC is a powerful tool for measuring performance. It is a cost accounting methodology that can provide definitions of processes, identify what the cost drivers are, determine the unit costs of outputs (products and services), and create various reports that can be utilized to generate Activity-Based Budgets (ABB).

2.2.2.1 Activity-Based Budget (ABB).

The Activity-Based Budget (ABB) arose from the use of ABC by companies and its purpose and mission is to identify the resources that should be allocated to each activity and how these activities are contributing to customer satisfaction. The definition of ABB giving by Investopedia is:

> "ABB is a method of budgeting in which the activities that incur costs in every functional area of an organization are recorded and their relationships are defined and analyzed. Activities are then tied to strategic goals, after which the costs of the activities needed are used to create the budget.
>
> Activity-Based Budget stands in contrast to traditional cost-based budgeting practices in which a prior period's budget is simply adjusted to account for inflation or revenue growth. As such, ABB provides opportunities to align activities with objectives, streamline costs and improve business practices." (www.investopedia.com)

The ABB offers advantages when compared to traditional budgets, because it provides better control of resources since it is calculated based on the demands of the activities planned. It is also more flexible since it lets you perform scenario analysis and quickly check the changes in the demand for resources arising from changes in the goals. In addition, this system avoids spending without criteria, and it allows managerial decisions and negotiations to be based on facts. By looking at the cost structure of an organization via the processes that are actually being performed, managers can more effectively analyze the profit potential of a company's products and services. Cost efficiencies can be found by comparing activities performed in different areas of the organization and consolidating or rerouting certain functions.

At its essence, the Activity-Based Budget begins by looking at results and the activities that created them, as opposed to the Cost-Based Budget, which often begins with raw input and material and works outward. ABB can also help firms create more accurate financial forecasts. According to Lunkes (2003), the budget by activity centers

the attention on the costs of the activities necessary to produce and sale goods and services. It breaks down the indirect costs on cost centers with homogeneous activities. The managers use the criterion of cause and effect to identify cost drivers for each of these indirect costs centers. For Lunkes (2003), Activity-Based Budgeting is broader and connects with other administration functions. Besides being part of the system, it is part of the overall global strategic planning process, as well as of the control system, which monitors the operations of a specific period.

Activity-Based Budgeting (ABB) has a relationship with Activity-Based Costing (ABC). By knowing the drivers of activities and resources, determined in the implementation of the ABC, it is possible to quantify and project them on the basis of cost and performance. According to Kaplan and Cooper (1997), the ABB is the reverse of the ABC. It starts from allocating resource expenses down to activities, and, via activity cost drivers, down to cost objects (products, services and customers). In this case, costs move from top to bottom. In the ABB, the flux flows from bottom to top (Figure 16).

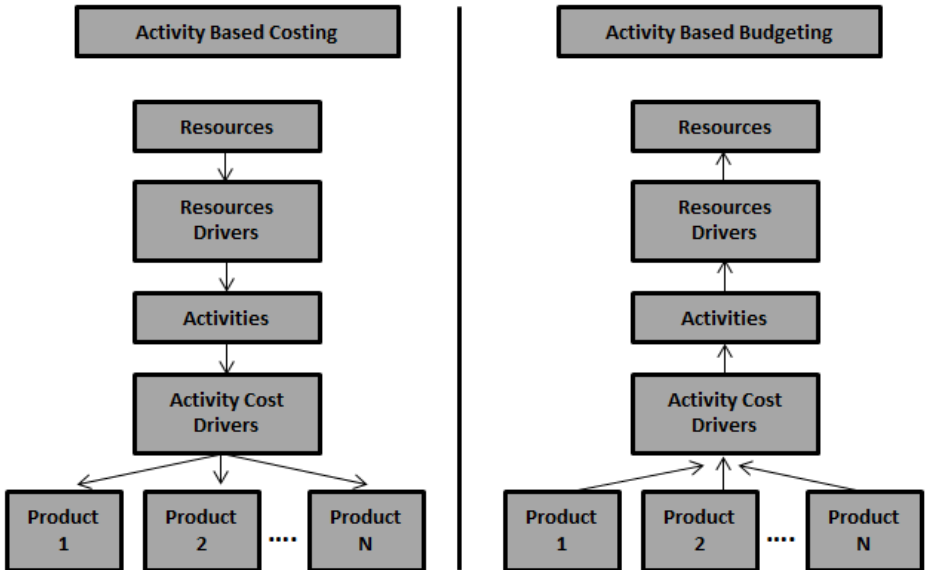


Figure 16. ABB Reverses the Causal Relationships of an ABC System. (Kaplan and Cooper, 1997)

The budget system based on activities produces a series of indicators that should be chosen for managers of each cost center, according to the usefulness of them for determination of activities. This budget system works as a guide for the decision maker to conduct the company's objectives. It enables the analysis of financial data and productivity indexes to see if the performance of processes and activities are providing the accomplishment of the goals established in the strategic plan.

The budget for activities provides companies greater control of resources, increased information and a better basis for designing the resource guidelines. This allows managers to acquire, provide or maintain only the resources needed to carry out the activities that will be executed in the future. When planning the activity, you need to reduce costs. This budget method becomes effective because it is able to regulate and control more effectively the use of financial resources.

The budgets for activities can be implemented through steps capable of predicting and relating the majority of costs and expenses with a particular mix of volume production, services or customers needs. According to Bleeker (2001), the budget for activity flows from products, services and clients to resources in eight steps (Figure 17). Before starting the process it is necessary to know well the financial goals and what is the financial-operational balance of the company. The initial steps can be repeated as many times as necessary, until reaching the expected operational and financial equilibrium.

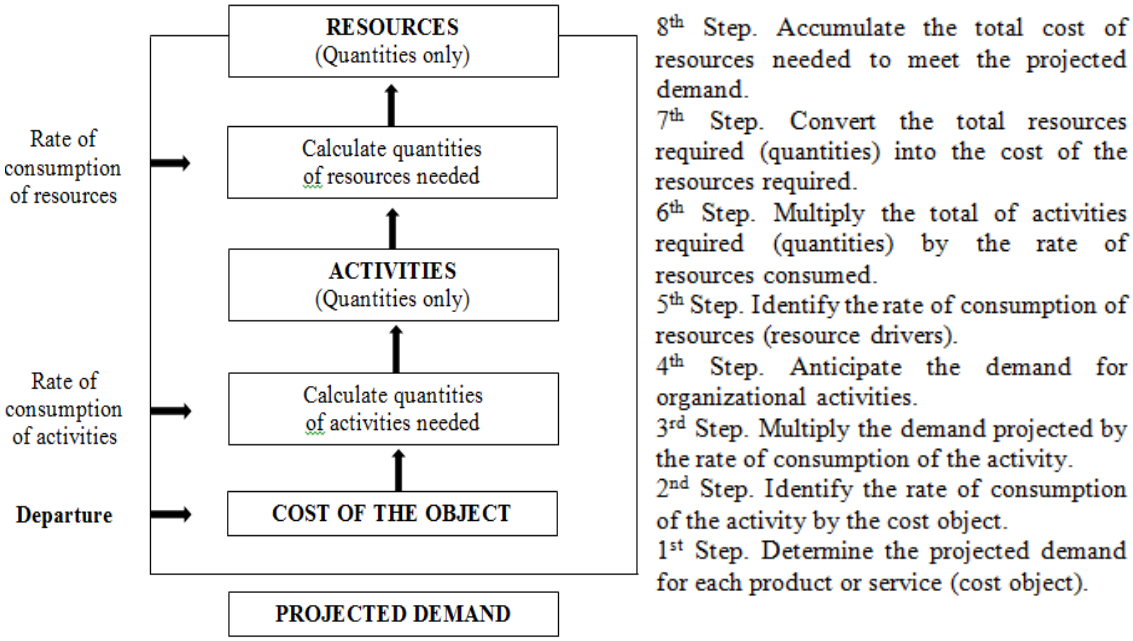


Figure 17. Basic Model of the ABB's Concept. (Bleeker, 2001)

Some advantages of the use of Activity-Based Budgeting are presented below:

a) Ability to prepare more realistic budgets;
b) Better identification of resources required;
c) Association of production costs;
d) Clearer binding of costs with the support of the staff board;
e) Identification of budget gaps;
f) Elimination of superfluous activities;
g) Selection of lower cost activities;
h) Reduction of the time or the resources committed in carrying out activities;
i) Multiple uses of activities;
j) Develop a case discretion;
k) Define priorities;
l) Offer cost justifications;
m) Monitor the benefits;
n) Assess the performance for continuous improvement.

In the case of this study, the application of the ABB approach in the CUI process lead to the development of the model to estimate the budget for each support event (an excel spreadsheet that estimates the budget based on the consumption rates of activities and resource drivers and on their current values). It provided the answer to the second part of the Primary Research Question (How to estimate the budget necessary to support

the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training).

2.3 Identification of Process Activities – Main Step for Implementing ABC and ABB Systems

Data needs to be collected in order to identify the resources the organizations need, the activities they perform, and the products/services they produce. There is also a need to identify the manner in which the activities consume the resources and how products/customers (cost objects) consume activities. There are many ways of gathering this type of data, all of which have advantages and disadvantages. It is relatively simple to identify the resources - an examination of the general ledger will reveal them (Miller, 1996).

This research will use the Delphi Method to identify the process activities required to develop the ABC and the ABB models. These models will allow the creation of tools to better calculate the logistical costs added by the performance of personnel support during military deployments executed by the Brazilian Air Force. They will also help in the preparation of more accurate budgets for each one of them, answering the Primary Research Question.

2.3.1 Delphi Method.

According to Linstone & Turoff (1975), the Delphi Method can be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem. Campana (1988) complements the previous concept stating that the Delphi method is a tool that relies almost exclusively on the concept of subjective probabilities, which are probabilities evaluated through empirical methods and sources. Thus, the information can

be obtained more easily from a technical or specialist, which, through his accumulated experience, can evaluate the issue with greater chances of success. Sackman (1975) succinctly summarizes the Delphi Method as an attempt to systematically collect the opinion of expert in order to get useful results.

The purpose of the Delphi Method is to capture the knowledge of experts in a certain area in order to reach consensus on the likelihood and timing of the occurrence of specific future events, improving decision-making about the future (Gupta; Clarke, 1996; Preble, 1983). It is assumed that the collective judgment organized appropriately is more accurate than the opinion of a single specialist (Wright; Giovinazzo, 2000).

Delphi has been designed to eliminate the weaknesses of traditional methods of meetings of experts. Meetings are often slow, expensive, dominated by one or a few individuals, and there is redundant or irrelevant information overload (Dalkey, 1972). The Delphi avoids these undesirable aspects through its key features, which are: anonymity of the participants, repetitive iterations, controlled feedback to the group, and the use of statistical measures for the information obtained (Preble, 1983; Dalkey 1972; Rowe; Wright, 1999). The method also promotes learning among members of the group, through sharing of knowledge (Gupta; Clarke, 1996; Lemos; Porto, 1998).

Linstone & Turoff (1975) states that there is a series of properties that allows a problem to be a candidate to be handled by the Delphi Method:

1. The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments of a collective basis;

2. Individuals required to contribute to the examination of a broad or complex problem have no track record of adequate communication and may present different backgrounds regarding their experience on the subject;

3. More individuals are needed beyond those that can effectively interact in an exchange of ideas face-to-face;

4. Time and cost make frequent group meetings infeasible;

5. The efficiency of face-to-face meetings can be increased through the supplementation of a structured group communication process;

6. Disagreements among individuals are so severe or politically divergent that the process of communication must be intermediate and the anonymity must be assured;

7. Participant's heterogeneity must be preserved to ensure valid results, that is, avoiding the domain by the number or the force of personalities involved.

For Rowe, Wright and Bolger (1991), the main criterion for the use of Delphi is to assess how indispensable it is to use information based on expert's judgment. The main cases are those when there is no historical data or when such data is not appropriate. Delphi can also be used in situations where moral or ethical considerations (ie, subjective issues) dominate those of economic or technical order, or even in situations where historical, economic or technical data are very expensive to obtain.

The method consists of a structured process of iterative learning involving a group of experts who respond to a sequence of question, preserving the anonymity of the individual estimates. Anonymity is a trick to reduce the effect of socially dominant individuals (Dalkey, 1972). Experts do not communicate during the process or do not know about the other participants, and they can freely express their opinions and avoid conflicts of group (political and personal) and the dominance of discussion by a participant or by a majority group (Gupta; Clarke, 1996; Lemos; Porto, 1998; Rowe; Wright, 1999). The selection of the experts that will participate in the process is one of the criticisms of the Delphi Method (Dietz, 1987). The quality and accuracy of the predictions depend mainly on the respondents (Wright; Giovinazzo, 2000).

One or more mediators can be responsible for the formulation of questions and feedback of the results to specialists (Davis; Aquilano; Chase, 2001). In preparing the

question, each issue presents a summary of the main information known about the subject, which should be obtained from the literature and/or through expert interviews (Wright; Giovinazzo, 2000). The number of questions varies depending on the types of issues and the profile of the respondents. A good value would be 25 issues (Wright; Giovinazzo, 2000). Kayo and Securato (1997) advise that the question should be restricted to 15 issues that can be answered in 2 or 3 minutes.

Between iterations of structured question, controlled feedback is offered. The controlled feedback is an artifice to reduce noise of answers. Through the feedback, the experts are informed of the views of their anonymous fellows and asked to do a review of their previous considerations (Dalkey, 1972). Therefore, the participants have the opportunity to change their initial estimates based on the feedback provided, to explore new issues that arise, and to discuss possible incompatibilities (Rowe; Wright, 1999; Wright; Giovinazzo, 2000).

Often, feedback is composed by the statistical summary of the quantitative responses of individual events analyzed and also qualitative information (comments and justifications of respondents) (Rowe; Wright, 1999; Dietz, 1987; Wright; Giovinazzo, 2000). Statistical measures are presented, usually using an average or median and interquartile ranges of the individual estimates (Dietz, 1987; Dalkey, 1972; Rowe; Wright, 1999). Measures of dispersion and frequency distribution are also used (Kayo; Securato, 1997).

One of the goals of Delphi is to achieve the greatest consensus among participants. The consensus can be determined by measuring the variance of the estimates of participants in iterations, with the reduction in variance being the indicator that a larger

consensus was achieved (Rowe; Wright, 1999). It is assumed that the iteration and feedback cause panel members to move their forecasts toward the correct answer. When the answers start to stabilize in the iterative process, the results of the final iteration are used as estimates for the prediction of events studied (Dietz, 1987). Although variable, the literature tends to report studies with no more than three iterations (Dietz, 1987; Rowe; Wright, 1999; Wright; Giovinazzo, 2000).

The methodology of applying a Delphi survey is presented in Figure 18.

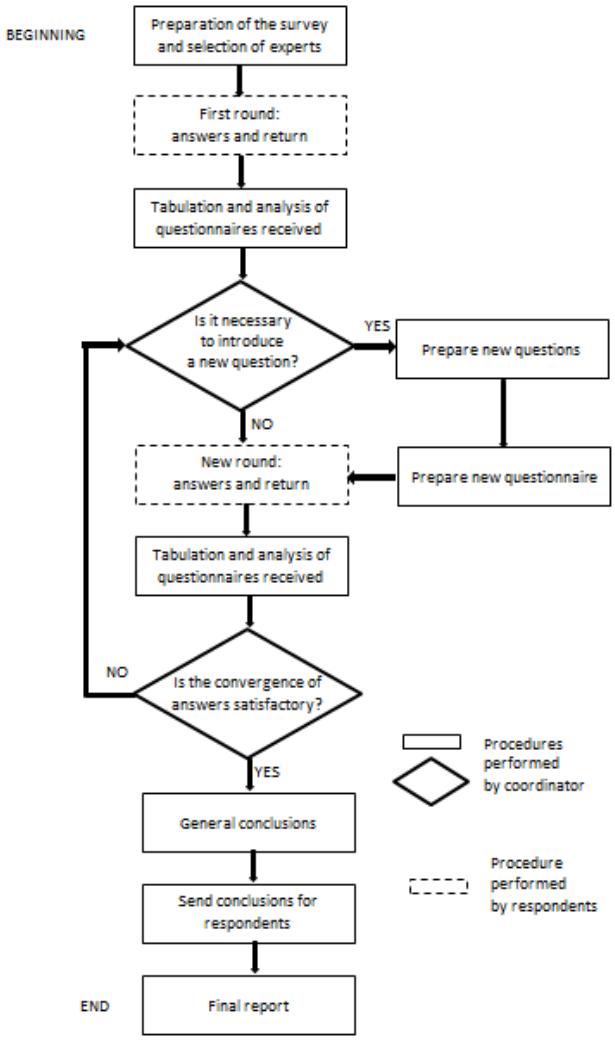


Figure 18. Sequence of Execution of a Delphi Survey.
(adapted from Wright; Giovinazzo, 2000)

The Delphi technique has good accuracy in medium-and long-term forecasts. (Georgoff; Murdick, 1986; Gupta; Clarke, 1996). Other perceived benefits using the Delphi method are, according to Preble (1983): Absence of contamination of results; efficient use of intuition of experts; results easily understood by laymen; unambiguous communication among participants; and procedural documentation. The limitations of this techniques are: Administrative complexity of the method; delay in obtaining results; the possibility to forcing consensus unduly; imposition of the mediator's point of view of the research through poorly structured question; poor techniques of summarization of the results; lack of criteria for selection of experts; and high production costs (Preble, 1983; Gupta; Clarke, 1996; Wright; Giovinazzo, 2000). This method has been used extensively in the planning and analysis of strategies, both in the public and private sector. In addition to being used in demand forecasts, the Delphi method is useful in such areas as project evaluation, investment analysis and financial planning (Gupta; Clarke, 1996).

In this research, the application of the Delphi Method led to the development of the following lists:

1. Phases, activities and tasks that need to be performed to support the basic needs of the troops during a deployment;

2. Activities, tasks and their related cost drivers that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support);

3. Phases, activities, tasks and related resources drives that need to be included in the calculation of the budget in order to reduce the difference between the value forecasted and the real value spent, calculated after the mission;

4. Annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of the troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip).

These lists answer the Subsidiary Research Questions and contain the basic information necessary for the implementation of the ABC and the ABB systems.

2.4 Summary

This chapter provided background information in how the Brazilian Air Force provides logistical support to the basic needs of military unit deployed and an analysis of historical data about how the reports of total costs and budgets for support events have been calculated in the past. It also presented the characteristics and steps of implementation of the ABC and the ABB systems and the Delphi Method. This Method was used as the methodology to collect the basic information to implement the ABC and the ABC systems.

The budget established to cover the expenses of support events and the reports of total costs have considered only major expenses. This fact has given the decision makers the erroneous impression that there are sufficient resources for accomplishing all objectives established. The models to be developed after the implementation of the ABC and ABB systems will enable the planners to better calculate the total costs and prepare more accurate budgets, addressing the core problem of this study. The step by step implementation of the ABC and ABB systems will be described in the next chapter.

III. Research Methodology

The purpose of this chapter is to describe the methodology used in this research. This research utilized the Delphi Method to answer the Subsidiary Research Questions. The results obtained with the performance of this method was used to implement the Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems. These systems were used to create the models that provide the answers to the Primary Research Question.

The first section of this chapter describes the application of the Delphi Method and the development of the lists needed to implement the ABC and the ABB systems. They were:

1. List of phases, activities and tasks that need to be performed to support the basic needs of the troops during a deployment;

2. List of activities, tasks and their related cost drivers that imply an additional cost beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support);

3. List of phases, activities, tasks and related resources drives that need to be included in the calculation of the budget in order to reduce the difference between the value forecasted and the real value spent, calculated after the mission; and

4. List of annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of the troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip).

The second section of this chapter shows the implementation of the ABC system and the development of the model to calculate the total costs of each support event (a report of total costs that groups all costs incurred in the performance of logistical activities of support to the basic needs of troops deployed). This model provided the answer to the first part of the Primary Research Question (How to calculate the total costs

of each support event performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for the support).

The third section describes how the ABB system was implemented and the development of the model to be used to estimate the budget for each support event (an excel spreadsheet that estimates the budget based on the consumption rates of activities and resource drivers and on their current values). This model provided the answer to the second part of the Primary Research Question (How to estimate the budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training).

3.1. Delphi Method

3.1.1 Why to Use the Delphi Method?

There is not a definition in the literature on which phases, activities, tasks or cost/resource drivers should be considered in the calculation of total costs incurred in the performance of logistical activities to support the basic needs of troops deployed or in the estimation of the budget for future deployments. A traditional survey could be performed to collect this information and to construct the lists cited at the beginning of this chapter, but the Delphi Method is a stronger methodology in the case of this research. Table 3 compares the Delphi Method and the traditional survey approach as a research strategy.

Table 3. Comparison of Traditional Survey with Delphi Method (C. Okoli, S.D. Pawlowski, Information & Management, 42 (2004) 15–29)

Comparison of traditional survey with Delphi method

Evaluation criteria	Traditional survey	Delphi study
Summary of procedure	The researchers design a questionnaire with questions relevant to the issue of study. There are numerous issues concerning validity of the questions they must consider to develop a good survey. The questionnaire can include questions that solicit quantitative or qualitative data, or both. The researchers decide on the population that the hypotheses apply to, and selects a random sample of this population on whom to administer the survey. The respondents (who are a fraction of the selected random sample due to non-response by some) fill out the survey and return it. The researchers then analyze the usable responses to investigate the research questions.	All the questionnaire design issues of a survey also apply to a Delphi study. After the researchers design the questionnaire, they select an appropriate group of experts who are qualified to answer the questions. The researchers then administer the survey and analyze the responses. Next, they design another survey based on the responses to the first one and readministers it, asking respondents to revise their original responses and/or answer other questions based on group feedback from the first survey. The researchers reiterate this process until the respondents reach a satisfactory degree of consensus. The respondents are kept anonymous to each other (though not to the researcher) throughout the process.
Representativeness of sample	Using statistical sampling techniques, the researchers randomly select a sample that is representative of the population of interest.	The questions that a Delphi study investigates are those of high uncertainty and speculation. Thus, a general population, or even a narrow subset of a general population, might not be sufficiently knowledgeable to answer the questions accurately. A Delphi study is a virtual panel of experts gathered to arrive at an answer to a difficult question. Thus, a Delphi study could be considered a type of virtual meeting or as a group decision technique, though it appears to be a complicated survey.
Sample size for statistical power and significant findings	Because the goal is to generalize results to a larger population, the researchers need to select a sample size that is large enough to detect statistically significant effects in the population. Power analysis is required to determine an appropriate sample size.	The Delphi group size does not depend on statistical power, but rather on group dynamics for arriving at consensus among experts. Thus, the literature recommends 10–18 experts on a Delphi panel.
Individual vs. group response	The researchers average out individuals' responses to determine the average response for the sample, which they generalize to the relevant population.	Studies have consistently shown that for questions requiring expert judgment, the average of individual responses is inferior to the averages produced by group decision processes; research has explicitly shown that the Delphi method bears this out.
Reliability and response revision	An important criterion for evaluating surveys is the reliability of the measures. Researchers typically assure this by pretesting and by retesting to assure test-retest reliability.	Pretesting is also an important reliability assurance for the Delphi method. However, test-retest reliability is not relevant, since researchers *expect* respondents to revise their responses.
Construct validity	Construct validity is assured by careful survey design and by pretesting.	In addition to what is required of a survey, the Delphi method can employ further construct validation by asking experts to validate the researcher's interpretation and categorization of the variables. The fact that Delphi is not anonymous (to the researcher) permits this validation step, unlike many surveys.
Anonymity	Respondents are almost always anonymous to each other, and often anonymous to the researcher.	Respondents are always anonymous to each other, but never anonymous to the researcher. This gives the researchers more opportunity to follow up for clarifications and further qualitative data.
Non-response issues	Researchers need to investigate the possibility of non-response bias to ensure that the sample remains representative of the population.	Non-response is typically very low in Delphi surveys, since most researchers have personally obtained assurances of participation.

Table 3. (Continued)

Evaluation criteria	Traditional survey	Delphi study
Attrition effects	For single surveys, attrition (participant drop-out) is a non-issue. For multi-step repeated survey studies, researchers should investigate attrition to assure that it is random and non-systematic.	Similar to non-response, attrition tends to be low in Delphi studies, and the researchers usually can easily ascertain the cause by talking with the dropouts.
Richness of data	The richness of data depends on the form and depth of the questions, and on the possibility of follow-up, such as interviews. Follow-up is often limited when the researchers are unable to track respondents.	In addition to the richness issues of traditional surveys, Delphi studies inherently provide richer data because of their multiple iterations and their response revision due to feedback. Moreover, Delphi participants tend to be open to follow-up interviews.

Based on this comparison, the Delphi method is the methodology used in this study due to the following reasons:

1. This study is an analysis of activities that should be considered to calculate the total costs to support the basic needs of a military unit deployed and to estimate the budget for support events to be performed. To address this multifaceted issue, it is necessary to collect information from people who have experience in this subject, people who have been working in support activities during deployments. The large groups used by the traditional surveys are not necessary in this case.

2. There is a limited number of experts with knowledge about the research questions. Since the Delphi panel size requirements are modest, it is not a problem to have few members in the group of experts.

3. The result of a panel study with experts can be more precise, rather than any individual technician response.

4. Delphi does not require a face to face meeting between the mediator and the group and between group members. It is useful in this situation in which the intermediary and experts are in different countries and when experts are spread across different states of the Brazilian territory.

5. The design of the Delphi Method is more flexible. It gives the experts the possibility of reviewing theirs answers based on the group responses. It encourages to a consensus about the topics and a deeper understanding of the research questions.

Based on the reasons just cited, the Delphi Method was the process of group communication used in this research. This method focused the decision making process on the choice of phases, activities, tasks and cost/resource drives. They are then analyzed to calculate the total costs of logistical activities to support the basic needs of military personnel deployed and to estimate the budget for future deployments.

In this research, the method was characterized by the application of a Delphi survey composed of 4 questions to a group of specialists in the area under analysis. The first time that a question was seen by the experts was considered the first round. A statistical analysis of the responses of a question was made after each round. The results were compiled and sent out to the experts in the next round. At that point, the experts had the opportunity to review their responses in light of the answers of the entire group, changing or validating their previous answers. The interactions continued in this way until a consensus was reached. A new question was only placed when the previous one was completely answered. The questions were considered completely answered when a consensus between experts' answers was reached. This research required 2 rounds for questions one and three, 3 rounds for question two, and 4 rounds for question four.

3.1.2 Selection of Experts.

According to Kayo and Securato (1997), most publications discussing the Delphi Method state that one of the pillars sustaining the process lies in the fact of using experts in the area to be searched. To Delbecq (1975), Delphi panelists should have a deep interest in the problem and great knowledge or experience on the subject in question. Thus, the first step is to identify a group of people who have specialization in the issue to be handled. Brockhoff (1975) defines specialization as a form of authority on a particular

subject. The author comments that specialization is the specialist knowledge that can be proved by demonstration or confirmation of a third party.

To select the expert panel members to participate in this research process, two criteria were defined: Those who have successfully concluded the course of preparation of planners (officers) and operators (sergeants) of Cellular Unit of Intendancy, and who have already participated in at least eleven deployments, working as planners or operators of the CUI. The criteria requirements were based on the following:

1. Planners and operators have different tasks and responsibilities during the deployments. So, allowing members of both groups to answer the questions will provide a broader view of the process.

2. All those who have successfully concluded the course of preparation of planners (officers) and operators (sergeants) of Cellular Unit of Intendancy have the basic theoretical knowledge about support events.

3. Considering that there were twenty-one deployments between 2006 and 2011, (according to the Summary Report of Budget and Costs, created by the Division of Operational Intendancy, in 2012), eleven deployments was considered enough to ensure practice experience of respondents (more than 50% participation in deployments).

Analyzing the database of planners and operators of the CUI, twelve experts, 6 officers and 6 sergeants, presented the prerequisites established, so they were chosen to respond to the Delphi survey. Table 4 identifies the expert panel member composition by rank and number of deployments performed.

Table 4. Panel Member Composition (Delphi Method)

Expert panel member	**Number of deployments**	**Expert panel member**	**Number of deployments**
Officers		**Sergeants**	
LtCol 1	11	MSgt 1	13
Maj 1	15	MSgt 2	13
Cap 1	14	1st Sgt 1	15
Cap 2	15	1st Sgt 2	12
1st Lt 1	14	2nd Sgt 1	14
1st Lt 2	11	3rd Sgt 1	11
Total	6 Officers	Total	6 Sergeants
Total		**12 members**	

In relation to the amount of people who participate in the Delphi panel, Delbecq (1975) states that this amount is variable. If the group is composed of homogeneous respondents, 10 or 15 people may be enough. However, when the panel is composed of several different groups, a few hundred people can participate. Since the panel assembled to answer the Subsidiary Research Questions presented in this thesis is a homogeneous group, twelve members were considered an adequate quantity.

Delbecq (1975) states that the contact with potential participants can be made by phone, in person, or through a person respected by the future respondent. In the case of this research, the first contact with the experts was made by phone. The participants were briefed about the importance of this study and the necessity of their participation. They were also informed about how the method will be applied and the time required to accomplish each step of the process. After all experts had chosen agreed to participate in this process, a letter of presentation was sent to them.

3.1.3 Letter of Presentation.

Delbecq (1975) recommends that a letter of presentation should be sent to the experts before starting the questions. So, after selecting the panelists and making the first contact, a letter of presentation was sent to them, by email, to explain the objectives of the Delphi panel and to motivate their participation in this study (Appendix A). In the case of this study, the presentation letter included: Thanks for participation, explanation about the need of experts' help, clarification about how the results of the method will be used, a brief presentation about the Delphi Method, and the dates set for each stage of the process.

3.1.4 Development of Delphi Questions.

To Delbecq (1975), the elaboration of the questions is the key of the process, because if the respondents did not understand the issue, they may respond inappropriately to it, become frustrated and lose interest. So, before sending the first question out to the experts, the four questions were sent to the Division of Operational Intendancy, the main headquarters of the CUIs, for a small review to gain inputs and critiques. These critiques were used to help to clarify and finalize the questions.

Regarding the type of questions, they are generally classified into three categories: open, closed and multiple choices. Marconi and Lakatos (1999) define and give examples of each kind of questions. The following characteristics are presented by the authors about each type:

1. Open questions: They allow the informant to respond freely, using his own language and expressing his opinion. They enable deeper and more accurate investigations. However, these complicate the responses of the experts (they need to compose it), the process of interpretation and the statistical treatment.

2. Closed or dichotomous questions: They are those in which the informant chooses his response among two options: yes or no. This type of question, though restricting freedom of responses, facilitates the work of the researcher regarding interpretation of data and statistical analysis of results.

3. Multiple choice questions: They are closed questions, but they present a series of possible responses, covering various facets of the same subject. The technique of multiple choices provides an in-depth exploration almost as good as open questions.

For the last type of question there is still the following division:

1. Questions with showcase: The possible answers are structured so that the informant can pick one or several of them. It has the disadvantage of suggesting the answer.

2. Estimation or evaluation questions: They consist of making a judgment, through a scale, with varying degrees of intensity, for the same item. Suggested answers are quantitative and indicate a degree of intensity increasing or decreasing.

To answer the Subsidiary Research Questions, based on the characteristics reported above, open questions were chosen for the first and fourth questions, since there was no intention of guiding expert's answers. Multiple choice questions with showcase were chosen for the second and the third surveys, since they used the responses generated by the immediately preceding question as the basis for the elaboration of the new answers (Table 5).

Table 5. Delphi Questions

Question 1	Open Question	The experts were asked to do a brainstorm and relate as many phases, activities and tasks as they could identify as necessary to perform a complete support event for the basic needs of troops deployed.
Question 2	Multiple Choices with Showcase	The experts were asked to pick all activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), from the list resulting from question one, and attribute the correspondents cost drivers.
Question 3	Multiple Choices with Showcase	The experts were asked to pick all phases, activities and tasks that they considered to be useful to estimate the budget of support events, from the list resulting from question two, and attribute the correspondent resource drivers.
Question 4	Open Question	The experts were asked to present their opinion about the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip).

3.1.4.1 Schedule of the Method.

This researcher had established a time horizon of 50 days to finish the process, but there was a delay of 27 days, totaling 77 days to complete the Delphi survey (Table

6). Some difficulties caused the postponement in the conclusion of the procedure. They were:

1.The experts took longer to send back their responses to the first question;

2. Three rounds were needed to achieve consensus for the third question;

3. Four rounds were necessary to obtain consensus for the fourth question; and

4. The activities were not executed during Christmas and New Year.

Table 6. Expected Time Horizon of the Application of the Delphi Method and the Real Schedule

Activities	Minimum estimated time (in days)	Estimate limit dates	Real time necessary (in days)	Real dates
Prepare letter of presentation	1	14 Nov	**1**	**14 Nov**
Send the letter of presentation	1	15 Nov	**1**	**15 Nov**
Response time	2	16 and 17 Nov	**2**	**16 and 17 Nov**
Develop the first question	1	18 Nov	**0**	**---**
Send the first question	1	19 Nov	**1**	**18 Nov**
Response time	7	20 to 26 Nov	**14** (11 to round 1 and 3 to round 2)	**19 to 02 Dec**
Analysis of the question 1	1	27 Nov	**1**	**03 Dec**
Develop the second question	1	28 Nov	**0**	**---**
Send the question	1	29 Nov	**1**	**04 Dec**
Response time	7	30 Nov to 6 Dec	**13** (7 to round 1, 3 to round 2 and 3 to round 3)	**05 to 17 Dec**
Develop the third question	1	7 Dec	**0**	**---**
Send the question	1	8 Dec	**1**	**18 Dec**
Response time	7	9 to 15 Dec	**11** (7 to round 1, 3 to round 2, 1 for Christmas)	**19 to 29 Dec**
Analysis of the question 3	1	16 Dec	**1**	**30 Dec**
Develop the fourth question	1	17 Dec	**0**	**---**
Send the question	1	18 Dec	**1**	**31 Jan**

Response time	7	19 a 25 Dec	**21** (11 to round 1, 3 to round 2, 3 to round 3, 3 to round 4, 1 for New Year)	**01 to 21 Jan**
Analysis of the question 4	1	26 Dec	**1**	**22 Jan**
Prepare and submit the final report	7	27 Dec to 02 Jan	**7**	**23 to 29 Jan**
Total time (in days)	**50**	**---**	**77**	**--**

There was an expectation that some experts might quit during the process. However, all twelve experts participated in all phases of the process, answering all questions.

3.1.5 Analysis of Responses.

The answers of all rounds of all questions were returned via email. After the return of the responses, the phase of analysis and comparison of results began. Kuespert and Estes (1976) suggest that, in relation to questions that ask for explanations or comments, the final answer should be a consolidation of the responses of all panelists, including the number of panelists who used each answer. According to Wright and Giovinazzo (2000), the questions that use multiple choices must show the amounts and percentages of panelists who choose each alternative.

For the first question – rounds 1 and 2 (Appendix B and D), which used an open question to address the first Subsidiary Research Question, the responses mentioned by more than one panelist were added only once (Appendix C). The number of panelists who have considered each response in each round was computed and it can be seen at the Appendix D. All answers were considered, and they were compiled into a single list, final result of question one (Appendix E).

For the second question – rounds 1, 2 and 3 (Appendix F, H and J), which used a closed question with showcase to address the second Subsidiary Research Question, the responses mentioned by more than one panelist were added only once (Appendix G and I). All alternatives and the percentage of experts who have chosen each one of them in each round can be seen at Appendix J. All alternatives chosen by the respondents were considered, and they were compiled into a single list, final result of question two (Appendix K).

For the third question – rounds 1 and 2 (Appendix L and N), which also used a closed question with showcase to address the third Subsidiary Research Questions, the responses mentioned by more than one panelist were added only once (Appendix M). All alternatives and the percentage of experts who have chosen each one of them in each round can be seen at Appendix N. All alternatives chosen by the respondents were considered, and they were compiled into a single list, final result of question three (Appendix O).

For the fourth question – rounds 1, 2, 3 and 4 (Appendix P, R, T and V), which used an open question to address the fourth Subsidiary Research Question, all answers were considered (Appendix Q, S and U). The mean and the standard deviation were calculated for the values presented by the experts in each round, and they can be seen at Appendix V. The answers were reviewed and evaluated by the experts until there were no more changes in responses. The final values achieved were compiled into a single list, final result of question four (Appendix W).

Once the final answers to all question were available, the researcher consolidated them into the Final Report.

3.1.6 Final Report.

The final report is the document that gives legitimacy to the actions to be taken by the decision makers (Delbecq, 1975). In this study, the final report (Appendix X) summarized the questions of the Delphi process and the final results obtained. It also invited the experts to analyze if their answers were in accordance with the lists created. So, the lists created could be validated and the Delphi panel could be finalized properly.

According to Delbecq (1975), the results of the Delphi study can provide a guide for planning. If Delphi has been used to identify problems, the result should lead to an understanding of the question and support programs of solutions. If Delphi was used to identify factors to be considered in evaluation programs, the final report suggests the weights to be given to each of them. If Delphi was used to identify the essential components of a solution, the final report contains the key pieces of the process under analysis. The last one was the case of this study. The Delphi Method identified the essential components needed to calculate the total costs of each support event and to estimate the budget for future deployments. The final report contained the answers of the Subsidiary Research Questions.

3.2 Activity-Based Costing (ABC) and Activity-Based Budget (ABB) Systems

The main problem stated in this study is that, currently, the estimated budget and the report of total costs for the support of the basic needs of the fighters from a military unit deployed do not reflect the reality of the CUI expenses. The estimated budget presents values much lower than those presented in the reports of total costs, prepared after finishing each support event, and the report of total costs covers only a few activities

performed in each support event. This fact gives the decision makers the erroneous impression that there are sufficient resources for accomplishing all objectives established.

Planners (officers) must be able to provide more precise estimated budgets and more accurate reports of total costs, based on the cost of the activities performed in each support event. To do so, they must be able to track all activities and tasks that add cost to the process and evaluate the costs incurred in each support event. The ABC and ABB systems can be used to generate better reports of total costs and better estimates of budgets, respectively. It will help the managers to correct the actual system, by addressing the core problem of this research.

3.2.1 Implementing the ABC System.

One of the benefits of ABC is that it allows management to understand what causes costs to be incurred (Ellis-Newman and Robinson, 1998). The usefulness of an ABC system depends on the level of detail of definition of the activities, how much work it takes to associate costs with activities, and whether or not the user of information can interpret it correctly (Beajou and Singhal, 1990). Companies have developed ABC systems so that they can directly link costs of performing organizational activities to the products and customers for whom the activities are performed (Cooper and Kaplan, 1991).

However, the implementation of an ABC system depends on an analysis of the benefits that it will bring or not to the organization. Will ABC show costs or other results that are significantly different from ones used so far? If better information will be generated by the new system, will new information change the decisions made by the management (Estrin; Kantor; Albers, 1994)? If the managers are aware of problems

created by their existing cost system and are sufficiently concerned to want to correct the system, they must be willing to assign resources to implement ABC (Sharman, 1993).

In the case of this research, the implementation of the ABC system evaluated all phases, activities and tasks that need to be consider to calculate the total costs required to perform a complete support event. It allowed the development of the ABC model, a new report of total costs, more complete than that used in the previous years. The ABC model will change the decisions made by management so far.

Chapter 2 enumerated the steps necessary to implement the ABC system. They are:

1. Develop the activity dictionary,
2. Determine how much the organization is spending on each of its activities,
3. Identify the organization's products, services and customers, and
4. Select activity cost drivers that link activity costs to the organization's products, services and customers.

The step by step implementation of the ABC system in this research will be described below.

Step 1. Develop the Activity Dictionary.

The activities performed by an organization are the first and the most important step in the development of an ABC system (Harr, 1991; Lewis, 1995; Brimson, 1991). So, first of all, it was necessary to describe all actions involved in the process, the activity dictionary. All activities being performed to support the basic needs of the fighters from a military unit deployed were described by verbs and associated with objects. The list created as the final result of the first question of the Delphi Method (Appendix E) was the activity dictionary of the process under analysis. It showed which phases, activities and

tasks need to be performed to execute a complete support event. After identifying all the activities performed, it was possible to move to the next step.

Step 2. Determine How Much the Organization is Spending on each of its Activities.

In this step, the expenses (payment, maintenance, food, etc) should be tracked and linked to the activities. According to Kaplan and Cooper (1997), it exposes how much the organization is spending on performing each activity. At that point, the list obtained as the final result of question one (Appendix E) was reduced to a list containing only activities and tasks that add costs to the process. It was the final result of question two and it can be seen at Appendix K. The costs related to each task will be completed by the officer responsible for calculating the total costs with the current value of each expense in the report when the activities are being performed.

Step 3. Identify the Organization's Products, Services and Customers.

The first 2 steps for building the ABC system have identified the activities being performed and the cost of performing these activities. Now, it is necessary to identify what the organization is producing (product/service) and for whom. This will help to answer the following question: Why is the organization performing those activities and are they worth doing?

A support event of excellence is the final product offered by the CUI to the troops deployed (customers). All activities performed are extremely important. They need to be performed to maintain the well-being and the morale of the troops to improve the overall result of the mission. The performance of these activities is more than worth the effort. After answering these questions, it is possible to move to the fourth and final step in building the ABC system.

Step 4. Select Activity Cost Drivers that Link Activity Costs to the Organization's Products, Services and Customers.

The linkage between activities and costs is obtained by using activity cost drivers. According to Kaplan and Cooper (1997), an activity cost driver is a measure of the output of an activity. The list with the activities and the correspondent cost drivers was the final result of the second question of the Delphi Method (Appendix K). Only those activities and tasks that add cost to the process were considered, as established in the second Subsidiary Research Question. Below is an example of the list of activities, tasks and their related cost drivers (Figure 19).

Activities	Tasks	Cost Drivers
Phase 01 - Mobilization (preparation /concentration means)		
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem
		Ticket price (round trip)
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck

Figure 19. Example of the List of Activities, Tasks and their Related Cost Drivers .

3.2.2 Developing the ABC Model.

The list of activities, tasks and their related cost drivers cited in the last step of the ABC system implementation (Appendix K) was used to develop the ABC model (a report of total costs that list all costs incurred in the performance of logistical support activities for the basic needs of troops deployed). Below is an example of the report of total costs for support events (Figure 20).

Activities	Tasks	Cost Drivers	Cost Drivers Information										Partial Costs per Cost Drive	Partial Costs per Activity
Phase 01 - Mobilization (preparation /concentration means)														
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of team members											
			Number of travel days											
		Ticket price (round trip)	Value of ticket											
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)											
			Km traveled if truck (round trip)											
			Consumption of fuel (Km/L)											
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant-Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of crew members											
			Number of travel days											

Figure 20. Example of the Report of Total Costs for Support Events.

The complete ABC model, the report of the total costs, can be seen in Appendix Y.

After filling out the whole report with the information about each cost driver, the calculations can be done using the equations listed in Appendix Z. The total costs of support will be achieved by adding the partial costs of all activities. Below is an example of how to calculate the cost for the first activity of the first phase (Figure 21).

Activities	Tasks	Cost Drivers	Equations
Phase 01 - Mobilization (preparation /concentration means)			
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	(Number of team members (per rank) x Value of Per diem (per rank) x Number of days of visit) + (Number of team members (total) x Additional for loading)
		Ticket price (round trip)	Number of team members x Value of each ticket
		Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)

Figure 21. Example of How to Calculate the Cost for Activity 1 (Phase 01).

The ABC model, the report of total costs, answered the first part of the Primary Research Question, which is: How to calculate the total costs of each support event performed, based only on those activities and tasks that imply additional costs beyond the

normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for the support?.

3.2.3 Implementing the Activity-Based Budget (ABB) System.

The ABC system implementation, described in section 3.2.1, allowed the implementation of the ABB system. According to Barrett, Meegan and Townley (2007), the Activity-Based Budget (ABB) relies on cost breakdown and the prior application of the Activity-Based Costing (ABC) system because the ABB shares much of the data required for ABC.

Barrett, Meegan and Townley (2007) highlighted that organizations that have adopted ABB have gained many benefits, such as:

1. Reduction of time and costs involved in budgeting and reforecasting: When managers need to reforecast using ABB, there is no need for them to work on new spreadsheets because all the rules and assumptions are incorporated in the budget model. It is necessary to only review and change key operational drivers which typically takes a matter of minutes. This reduces the time and cost involved in planning and budgeting, giving managers more time to focus on other tasks.

2. Better visibility of future performance: The speed and ease of reforecasting with ABB means that reforecasts can be done more frequently.

3. Possibility of analysis of different situations: ABB allows organizations to rapidly evaluate the financial impact of different business scenarios.

Chapter 2 enumerated the steps necessary to implement the ABB system. They are:

Step 1. Determine the projected demand for each product or service (cost object);

Step 2. Identify the rate of consumption of the activity by the cost object;

Step 3. Multiply the demand projected by the rate of consumption of the activity;

Step 4. Anticipate the demand for organizational activities;

Step 5. Identify the rate of consumption of resources (resource drivers).

Step 6. Multiply the total of activities required (quantities) by the rate of resources consumed;

Step 7. Convert the total resources required (quantities) into the cost of the resources required;

Step 8. Accumulate the total costs of resources needed to meet the projected demand.

The step by step implementation of the ABB system in this research will be described below.

Step 1. Determine the Projected Demand for each Product or Service (Cost Object).

The first step in establishing the ABB consists of determining the projected demand of each product or service (cost object). For this study, the projected demand was indicated by the experts in the fourth question of the Delphi Method (Appendix W) - 6 support activities for standard deployments a year (6 support events up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip). That was the first part of the answer to the fourth Subsidiary Question.

Logistical support made by the CUI during deployments aims to sustain the basic needs of military troops, for training or actual employment. So, the military group supported in each deployment is the cost object of the process under analysis.

Step 2. Identify the Rate of Consumption of the Activity by the Cost Object.

As shown in the list of phases, activities and tasks necessary to perform a complete support event, the activity dictionary (Appendix E), the CUI needs to perform various activities to support troops deployed. However, for the calculation of the budget, only the activities selected by the experts as the final result of the third question of the Delphi Method (Appendix O) were used in the application of the ABB analysis. The reason for selecting only the activities considered useful for calculating the budget is that at the moment of planning, some cost information is not known or cannot be estimated. So, consideration of them is not necessary.

The list of phases, activities and tasks considered useful to estimate the budget (Appendix O) was used to implement the second step of the ABB system. In this step it is necessary to identify the rate of consumption of the activities by the cost object. The experts established that all activities identified are executed only once in each support event. That was the second part of the answer to the fourth Subsidiary Question. The final result of the fourth question of the Delphi Method can be seen in Appendix W.

Step 3. Multiply the Demand Projected by the Rate of Consumption of the Activity.

Then, in the third step, it was necessary to establish the total demand of consumption of activities, multiplying the projected demand by the rate of activities consumed. The experts established that the projected demand for support events was 6 per year and that the rate of all activities consumed was 1. So, the total demand of activities consumed was 6.

Step 4. Anticipate the Demand for Organizational Activities.

To perform 6 support events a year it is necessary to forecast the demand for activities (fourth step), by identifying which activities are needed to accomplish each support. At this stage, all activities performed by the CUI were separated into primary (operational) and secondary (support) events. For the CUI, the primary activities (operational) are those performed during the deployment, and the secondary activities (support) are those performed during the phases of mobilization and demobilization. Analyzing the list of phases, activities and tasks necessary to perform a complete support event, the activity dictionary (Appendix E), it was possible to identify 21 primary (operational) and 23 secondary (support) activities, totaling 54 activities developed by the CUI per support event.

Step 5. Identify the Rate of Consumption of Resources (Resource Drivers).

The fifth step aims to identify the drivers of resources and their rate of consumption. The activity “Perform precursory visit”, for example, uses the following resource drivers: Per diem and Ticket (round trip). The experts defined the rates of consumption for all resource drivers. Below is an example of the rate of resource drivers consumed per support event (Figure 22).

Activities	Tasks	Resource Drivers	Specification of Resource Drivers	Consumption Rates of Resource Drivers (per support event)
Phase 01 - Mobilization (preparation /concentration means)				
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	3
			Number of days	3
		Ticket (round trip)	Number of military	3

Figure 22. Example of the Rate of Resource Drivers Consumed per Support Event.

This list answered the third part of the fourth Subsidiary Question. The final result of the fourth question of the Delphi Method can be seen at Appendix W.

Step 6. Multiply the Total of Activities Required (Quantities) by the Rate of Resource Drivers Consumed.

The sixth step quantifies the total demand of resources drivers consumed (per year) by multiplying the total demand for activities consumed by the rate of resource drivers consumed. Below is an example of the total demand for resource drivers consumed (Figure 23).

Activities	Tasks	Total demand for activities consumed (per year)	Resource Drivers	Specification of Resource Drivers	Consumption Rates of Resource Drivers (per support event)	Total demand for resource drivers consumed (per year)
Phase 01 - Mobilization (preparation /concentration means)						
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	6	Per diem	Number of military	3	18
				Number of days	3	18
			Ticket (round trip)	Number of military	3	18
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI		Per diem during preparation of material	Number of military	6	36
				Number of days	5	30
3. Provide material and equipment	3.1 Buy material and equipment		Purchase	Number of purchases	1	6
4. Provide food	4.1 Buy items to prepare and serve meals		Purchase	Number of purchases	1	6
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48
				Km traveled (round trip)	4000	24000
				Consumption of fuel (Km/L)	6	36
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp		Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	120
				Number of days	1	6

Figure 23. Example of the Total Demand for Resource Drivers Consumed.

The complete list of the total demand for resource drivers consumed (per year) can be seen in Appendix AA.

Step 7. Convert the Total Resources Required (Quantities) into the Cost of the Resources Required.

After identifying the quantities of resource drivers required (the sixth step), the cost of each resource can be calculated. In this step, the total demand of resources consumed must be multiplied by the current value of each resource driver. The value of each resource driver will be presented by the officer responsible for budgeting at the moment of planning support events for the next period.

Step 8. Accumulate the Total Costs of Resources Needed to Meet the Projected Demand.

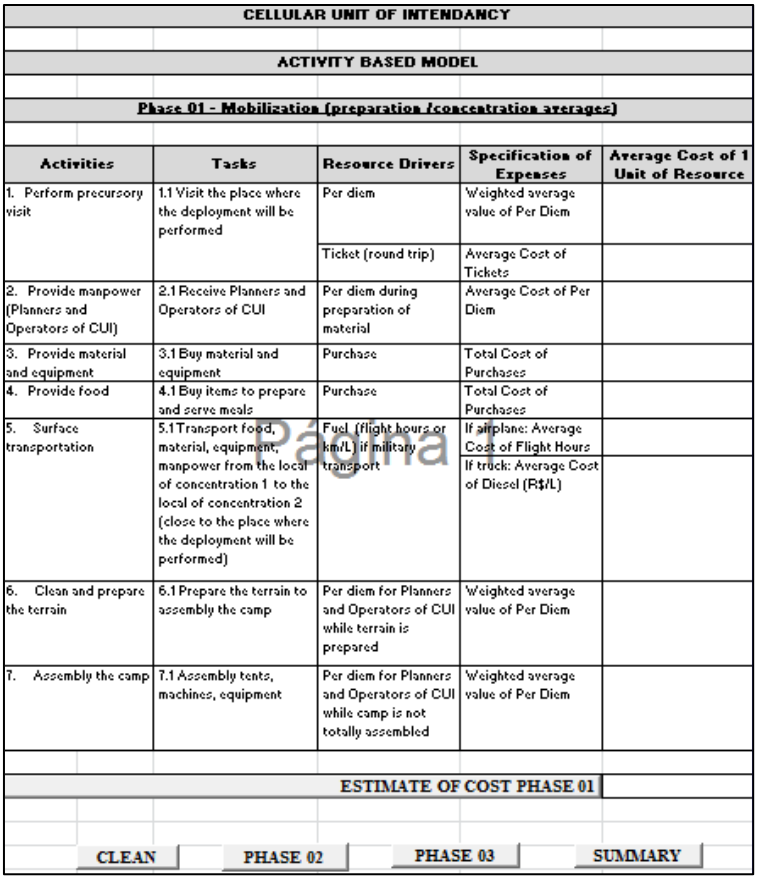
Finally, in the eighth step, the accumulation of the total costs of resources to meet projected demand will be accomplished. After quantifying the resource drivers in all

activities, and projecting the cost of each one of them, the values will be summed to get the total budgeted for the support events.

3.2.4 Developing the ABB Model.

To use the ABB analysis built in the previous section to estimate the budget for each support event to be planned, it is not necessary to perform all the 8 steps cited above again. Once the basic analysis is done, there is no need for working on new tables because all the rules and assumptions are incorporated by the ABB system implemented. It is necessary to only review and change values of the resource drivers. The ABB model (an excel spreadsheet that estimates the budget based on the consumption rates of activities and resource drivers and on their current values) will allow better estimates of the budget.

Below is an example screen of the ABB model that will be filled in by the officer responsible for budgeting (Figure 24).



CELLULAR UNIT OF INTENDANCY

ACTIVITY BASED MODEL

Phase 01 - Mobilization (preparation /concentration averages)

Activities	Tasks	Resource Drivers	Specification of Expenses	Average Cost of 1 Unit of Resource
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Weighted average value of Per Diem	
		Ticket (round trip)	Average Cost of Tickets	
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Average Cost of Per Diem	
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Total Cost of Purchases	
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Total Cost of Purchases	
5. Surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	If airplane: Average Cost of Flight Hours	
			If truck: Average Cost of Diesel (R$/L)	
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Weighted average value of Per Diem	
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Weighted average value of Per Diem	
			ESTIMATE OF COST PHASE 01	

CLEAN | PHASE 02 | PHASE 03 | SUMMARY

Figure 24. ABB model – Example of the Excel Spreadsheet that Estimates the Budget.

All screens of the ABB model can be seen at Appendix BB.

The excel program uses macros to produce the estimate of the budget. The macros are subroutines that can perform preprogrammed tasks, usually activated by a single button. In the case of this study, the preprogrammed tasks used by the macros were the assumptions developed during the performance of the 8 steps for implementing the ABB system. Below is an example of the screen of the ABB model that contains the macros (Figure 25).

Activities	Tasks	Total demand of activities consumed (per year)	Resource Drivers	Specification of Resource Drivers	Consumption Rates of Resource Drivers (per support event)	Total demand of resource drivers consumed (per year)	Mean Cost of 1 Unit of Resource Drive	Cost per Reource Drive	Cost per Activity per Support Event	Cost per Activity per Year (06 support events)
Phase 01 - Mobilization (preparation /concentration means)										
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	6	Per diem	Number of military	3	18				
				Number of days	3	18				
			Ticket (round trip)	Number of military	3	18				
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI		Per diem during preparation of material	Number of military	6	36				
				Number of days	5	30				
3. Provide material and equipment	3.1 Buy material and equipment		Purchase	Number of purchases	1	6				
4. Provide food	4.1 Buy items to prepare and serve meals		Purchase	Number of purchases	1	6				
5. Surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48				
				Km (round trip)	4000	24000				
				Consumption of fuel (Km/L)	6	36				
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp		Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	120				
				Number of days	1	6				
7. Assembly the camp	7.1 Assembly tents, machines, equipment		Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20	120				
				Number of days	2	12				
ESTIMATE OF COST PHASE 01										

Figure 25. ABB model – Example of the Excel Spreadsheet that Contains the Macros

The complete screen of the ABB model with the macros can also be seen at Appendix BB. This screen will not be filled by the officer responsible for budgeting. It will be automatically be filled by the macros.

The ABB model answers the second part of the Primary Research Question which is: How to estimate the budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training?

3.3 Summary

This chapter described the methodology used in this research. This research utilized the Delphi Method to answer the Subsidiary Research Questions. The result obtained with the performance of this Method was used in the implementation of the Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems. These systems were used to create the models that provide the answers to the Primary Research Question.

The ABC model (a report of total costs that list all costs incurred in the performance of logistical support activities for the basic needs of troops deployed) allowed a better calculation of the total costs of each support event (Appendix Y). It answered the first part of the Primary Research Question, which is: How to calculate the total costs of each support event performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for the support? The ABB model (an excel spreadsheet that estimates the budget based on the consumption rates of activities and resource drivers and on their current values) allowed a better estimation of the budget necessary to accomplish each support event. It answered the second part of the Primary Research Question which is: How to estimate the budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training?

The next chapter will present the results of the Delphi Method. It will also focus on the test of the ABC and ABB models created in this chapter. They will be used in a real support event, in an attempt to verify their applicability.

IV. Results

The purpose of this chapter is to present the results of this research. The first section will present the results of the Delphi Method and how they were used to answer the Subsidiary Research Questions. The information presented will contain the initial answers of the experts for each question and the changes made through the rounds of the Delphi Method. The Delphi study involved the analysis of 4 questions. Each new question was only presented when the previous one was totally completed. Questions one and three required 2 rounds to be concluded, question two required 3 rounds, and question four required 4 rounds.

The results of the Delphi Method were the basic requirement to implement the ABC and ABB systems. The previous chapter presented how these systems were applied and how the ABC and ABB models were developed. The second section of this chapter will present a brief summary of the development of these models. The performance of these models aims to provide the answer to the Primary Research Question of this research, which is:

1.How to calculate the total costs of each support activity performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for support; and

2.How to estimate the budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

The third section of this chapter will present the result of the test of these models. The ABC and ABB models developed were applied in a real support event, the Operation “ACISO BH 2013”, to verify their applicability. This operation occurred at the city of Belo Horizonte - Brazil, from 14 to 25 of January. During this period, the personnel involved received the support of the CUI.

4.1 Results of the Delphi Method

4.1.1 Question One.

Question One	Open Question	Round 1 - Appendix B Round 2 - Appendix D	The experts were asked to do a brainstorm and relate as many phases, activities and tasks as they could identify as necessary to perform a complete support event for the basic needs of troops deployed.

The goal of question one was to obtain the key phases, activities and tasks that the respondents have identified as necessary to perform a complete logistical support event for the basic needs of troops deployed. The responses mentioned by more than one panelist were added only once. The first round of this question provided a list with 3 phases, 44 activities and 94 tasks. All experts indicated that 3 phases were necessary to support the basic needs of the troops during a deployment. The phases cited were: Phase 01 - Mobilization (preparation /concentration means), Phase 02 - Operation (logistical support through time), and Phase 03 - Demobilization (recovery of personnel and materials). The number of activities and tasks attributed to each phase was: 15 activities and 35 tasks attributed to phase 01, 21 activities and 40 tasks attributed to phase 02, and 8 activities and 19 tasks attributed to phase 03. From the total of 94 tasks indicated, 28 (30%) were cited by all experts. No activities or tasks were cited by less than 4 experts (33%). The responses of all experts to the first round of question one can be seen at Appendix C.

With the responses from round 1 collected, the answers were compiled into a single list and sent out to the experts in round 2. For round 2, the members were asked to confirm the completeness of the list created. No experts added more phases, activities or

tasks to their previous answers. They did not eliminate phases, activities or tasks cited by other experts. Finally, they agreed that the list created was sufficient.

The complete list of phases, activities and tasks that the respondents have identified as necessary to perform a logistical support event for the basic needs of troops deployed is showed at Appendix E. This list was the final result of question one. It answered the first Subsidiary Research Question (What are the phases, activities and tasks that need to be performed to support the basic needs of the troops during a deployment?).

4.1.2 Question Two.

Question Two	Multiple Choice with Showcase	Round 1 - Appendix F Round 2 - Appendix H Round 3 - Appendix J	The experts were asked to pick all activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), from the list resulting from question one, and attribute the correspondents cost drivers.

The goal of question two was to select from the list resulting from question one only those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and attribute their corresponding cost drivers. The first round of this question provided a list with 3 phases, 27 activities, 33 tasks and 41 cost drivers. The number of activities and tasks selected from each phase was: 9 activities and 11 tasks selected from phase 01, 13 activities and 15 tasks selected from phase 02, and 5 activities and 7 tasks selected from phase 03. From the total of 41 cost drivers recommended, 22 (54%) were cited by all

experts. No activities or tasks were selected by less than 3 experts (25%). The responses of all experts to the first round of question two can be seen at Appendix G.

All alternatives chosen by the respondents in the first round were compiled into a single list and sent out to the experts in round 2. For round 2, the members were asked to evaluate the list created. Some experts changed their previous answers in light of the group responses by selecting more activities or tasks. The experts selected 4 more activities, 10 tasks and 49 cost drivers from the list resulting from question one. The number of activities and tasks selected from each phase in round 2 was: 1 activity and 4 tasks selected from phase 01, 1 activity and 1 task selected from phase 02, and 2 activities and 5 tasks selected from phase 03. From the total of 49 new cost drivers recommended, 1(2%) was selected by 9 experts (75%) and 14 (29%) were selected by 6 experts (50%). No activities or tasks were select by less than 2 experts (17%). The responses of all experts to the second round of question two can be seen at Appendix I.

The activities and tasks selected by the respondents and the costs drivers added in the second round were included in the list resulting from round 1 and sent out to the experts in round 3. For round 3, the members were asked to evaluate the new list created. No experts added more activities, tasks or cost drivers to their previous answers. They did not eliminate activities, tasks or cost drivers cited by other experts. Finally, they agreed that the list created was sufficient.

The final list of activities and tasks that imply additional costs beyond the normal operations of the Air Base and their related cost driver contained 10 activities, 15 tasks and 29 cost drivers in phase 01; 14 activities, 16 tasks and 32 cost drivers in phase 02; and 7 activities, 12 tasks and 19 cost drivers in phase 03. It is showed in Appendix K.

This list was the final result of question two. It answered the second Subsidiary Research Question (What are the activities, tasks and their related cost drivers that imply an additional cost beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support)?).

4.1.3 Question Three.

Question Three	Multiple Choice with Showcase	Round 1 - Appendix L Round 2 - Appendix N	The experts were asked to pick all phases, activities and tasks that they consider to be useful to estimate the budget for support events, from the list resulting from question two, and attribute the correspondent resource drivers.

The goal of question three was to select, from the list resulting from question two, those phases, activities and tasks that the experts considered to be useful to estimate the budget for support events and attribute their corresponding resource drivers. The first round of this question provided a list with 3 phases, 16 activities, 16 tasks and 18 resources drivers. The number of activities and tasks selected from each phase was: 7 activities and 7 tasks selected from phase 01, 6 activities and 6 tasks selected from phase 02, and 3 activities and 3 tasks selected from phase 03. From the total of 18 resource drivers recommended, 10 (56%) were cited by all experts. No activities or tasks were select by less than 4 experts (33%). The responses of all experts to the first round of question 3 can be seen at Appendix M.

With the responses from round 1 collected, the answers were compiled into a single list and sent out to the experts in round 2. For round 2, the members were asked to confirm the completeness of the list created. No experts added more activities, tasks or

resource drivers to their previous answers. They did not eliminate activities, tasks or resource drivers cited by other experts. Finally, they agreed that the list created was sufficient.

The complete list of phases, activities, tasks and related resource drivers that the experts considered to be useful to estimate the budget for support events is showed at Appendix O. This list was the final result of question three. It answered the third Subsidiary Research Question (Which phases, activities, tasks and related resource drivers need to be included in the calculation of the budget in order to reduce the difference between the value forecasted and the real value spent, calculated after the mission?).

4.1.4 Question Four.

Question Four	Open Question	Round 1 - Appendix P Round 2 - Appendix R Round 3 - Appendix T Round 4 - Appendix V	The experts were asked to present their opinion about the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip).

The goal of question four was to forecast the annual demand for support events and the consumption rates of activities and resource drivers to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip).

In the first round of question four, all experts indicated that all activities have the same consumption rate. They specified that all of them are consumed (executed) just

once. However, they did not agree on the annual demand for support events and on the consumption rates of all resources drivers. From the 18 resource drives evaluated, the experts only agreed on the consumption rate of 4 of them (22%). In these cases, the standard deviation between answers was equal zero. The values cited by each expert in round 1, the mean values obtained and the standard deviation between answers can be seen at Appendix Q.

The mean values of the values forecasted and the standard deviation between answers indicated by the respondents from round 1 were compiled into a single list and sent out in round 2. For round 2, the members were asked to evaluate the result. Some experts changed their previous answers in light of the group responses. Some changes in answers provoked changes in the mean values and all of them reduced the standard deviation between responses. The values cited by each expert in round 2, the mean values obtained and the standard deviation between answers can be seen at Appendix S.

The answers of rounds 1 and 2 were compiled into a single list and send back to the respondents in the third round to be evaluated. Still there were some changes. Some experts changed their previous answers one more time in light of the group responses. The changes reduced the standard deviation between answers even more. The values cited by each expert in round 3, the mean values obtained and the standard deviation between answers can be seen at Appendix U.

The answers of rounds 1, 2 and 3 were compiled into a single list and send back to the respondents in the fourth round to be evaluated. No experts changed their previous answers at this time. They agreed that the list created was sufficient. The complete list with the demand for support events, the consumption rates of all activities and resources

drivers is showed at Appendix W. This list was the final result of question four. It answered the fourth Subsidiary Research Question (What is the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of the troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip)?).

4.1.5 Final Report.

Once the answers to all questions were available, the researcher consolidated them into the Final Report (Appendix X). It summarized all responses to the Delphi process and the results obtained. It also invited the experts to analyze if the final result of each question was in accordance with their answers. It was sent to the experts and they validated the completeness of the lists created.

4.2 Development of Models

4.2.1 The ABC Model.

The list of activities, tasks and their related cost drivers cited in the last step of the ABC system implementation (Appendix K) was used to develop the ABC model. That list was transformed into the ABC model (Appendix Y), a report of total costs that list all costs incurred in the performance of logistical support activities for the basic needs of troops deployed. One more column was included to that list. This column will be filled by the officer responsible for calculating the total costs of the support event with the data about the resources consumed for each cost driver. After filling out the whole report of a specific support event, the costs of each activity can be calculate by using the equations of Appendix Z. Then, the total costs can be obtained by adding all partial costs listed.

The ABC Model, the report of total costs, answered the first part of the Primary Research Question, which is: How to calculate the total costs of each support event performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the Cellular Unit of Intendancy, responsible for the support.

4.2.2 The ABB Model.

The list with the total demand for resource drivers consumed (Appendix AA), obtained in the sixth step of the ABB system implementation (section 3.3.6 of this study), was used to develop the ABB model (an excel spreadsheet that estimates the budget based on the consumption rates of activities and resource drivers and on their current values). This list was transformed into an excel spreadsheet where the current average cost of each resource will be filled by the officer responsible for preparing the budget.

After all cells are filled with the correspondent current average cost, the program will use macros (subroutines that can perform preprogrammed tasks, usually activated by a single button) to produce the results. These results will show the estimate of cost per each phase, per support event and per year. The estimate of cost per year is the overall cost to accomplish 6 support activities (annual demand for support events recommended by the experts in the fourth question of the Delphi Method).

The ABB model answered the second part of the Primary Research Question which is: How to estimate the budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

4.3 Testing the Models

To test if the ABC and ABB models developed were applicable, they were implemented during a real support event. The objective of those models is to better calculate the total costs and the budget for support events for the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip). They provided the answer to the Primary Research Question.

To implement an adequate test of the models' applicability, it was necessary to apply them in a standard support event. The quantity of personnel involved and days of deployment should be the closest possible to the values considered when the models were developed (250 military, during 15 days). Given this specificity, the mission chosen to test the models was the Operation "ACISO BH 2013" (242 military, during 14 days). This operation occurred at the city of Belo Horizonte - Brazil, from 14 to 25 of January, to provide medical care for the needy population of the city. During this period, the personnel involved (220 military from the Field Hospital and the Secure Forces) received the support of the CUI team (22 members: 3 planners and 19 operators of CUI).

The first model used was the ABC model, the report of total costs (Appendix Y). The objective of this model was to calculate the total costs of the support activity being performed. The report of total costs was filled by the officer responsible for the CUI with the demand for all cost drivers and their respective costs. All expenses were tracked during the 03 phases of this deployment (Mobilization, Operation and Demobilization). At the end of all activities, the partial costs of each activity were calculated using the equations of Appendix Z. Then, they were added, and the total costs were calculated. The

complete ABC model filled for this support event can be seen at Appendix CC. The ABC model showed that R$ 178,006.40 was necessary to perform phase 01, R$ 433,383.96 to perform phase 02 and R$ 169,068.79 to perform phase 03, totalizing R$ 780,459.15 to accomplish all activities and tasks of this support event (Figure 26).

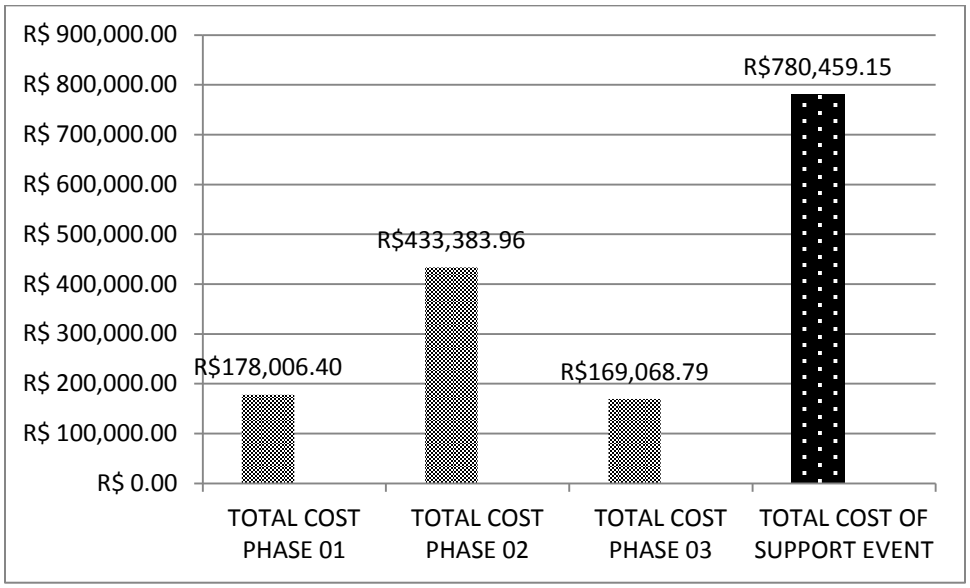


Figure 26. Total Costs Obtained by Applying the ABC Model during the Operation "ACISO BH 2013".

Analyzing the results obtained by applying the ABC model, it was possible to see that the most expensive phase was the second one. The cost of this phase represented 55.5% of all costs involved. The high value attributed to phase 02 was due to two main reasons: this phase contained the great majority of activities and tasks, and this phase contained the most expensive activity (activity number 14 - "provide financial support"). To perform this activity R$ 372,128.00 was necessary. This value represented 85.9% of the total costs of phase 02. The cost of phases 01 and 03 represented 22.8% and 21.7% of the total, respectively.

The ABB model was also applied during Operation "ACISO BH 2013", but with a limitation. The objective of this model was to estimate the budget necessary to perform

the support event. It should have been used prior to the event, but due to the delay of 27 days in the performance of the Delphi Method, the ABB model was not concluded before the operation. So, the expenses could not be forecasted before the performance of the support event.

However, the model was applied to the Operation "ACISO BH 2013" as soon as it was finished to analyze its results. The officer responsible for the CUI was instructed to consider the market values of the resources drivers presented before the operation to fill in the excel spreadsheet. In this way, the accuracy of the model could be kept. The values of resources drivers were added into the program and the budget was calculated. The screens with the results of the ABB model for this support event can be seen at Appendix DD. The ABB model showed that R$ 174,758.60 was necessary to perform phase 01, R$386,193.60 to perform phases 02 and R$ 141,112.00 to perform phase 03, totalizing R$ 702,064.20 to accomplish all activities and tasks of this support event (Figure 27).

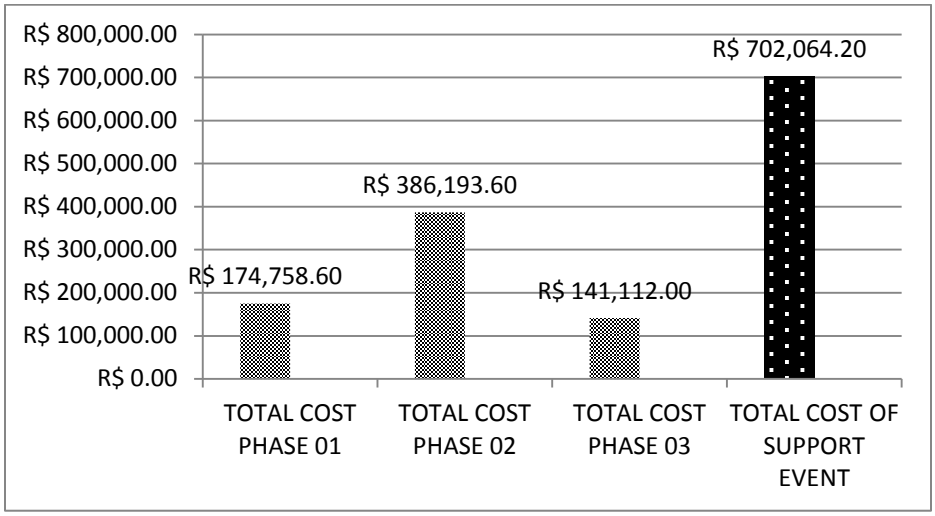


Figure 27. Estimate of Costs Obtained by Applying the ABB Model during the Operation "ACISO BH 2013"

Analyzing the results obtained by applying the ABB model, it was possible to see that the most expensive phase was also the second one. The cost of this phase represented 55% of all costs involved. The high value attributed to phase 02 was related to the high cost to perform activity number 14 – "provide financial support". To perform this activity R$323,959.60 was necessary. This value represented 83.9% of the total costs of phase 02. The cost of phases 01 and 03 represented 24.9% and 20.1% of the total, respectively.

The officer responsible for the CUI related that she did not find problems or difficulties to apply both models. She also related that, since the models were more detailed, they took her more time than those tools used in the years before. Beside that issue, she said that the models made the task of tracking costs and forecasting the budget easier than the old tools. She said that the ABC model is a tool more practical than any computer program because it could be printed and be in hand during each phase of support. So, she could write down all values at the time the expenses were executed or the resources were consumed, making the task of tracking the costs easier. She also said that the ABB model created is a very easy to use tool because it was only necessary to input the current average cost of the resources and the macros did all the math necessary to estimate the value required to accomplish the mission.

The main headquarters of the CUIs, the Division of Operational Intendancy, had also applied the old tools used years before during the Operation "ACISO BH 2013" to calculate the total costs and to estimate the budget for this support event. With these values, it was possible to compare the results. The old tool used to forecast the budget showed that R$40,362.10 would be necessary to accomplish this mission. The old tool to calculate the total costs showed that a total of R$146,479.30 was needed to perform all

activities and tasks. The values obtained by applying the old tools of calculation can be seen at Figure 28.

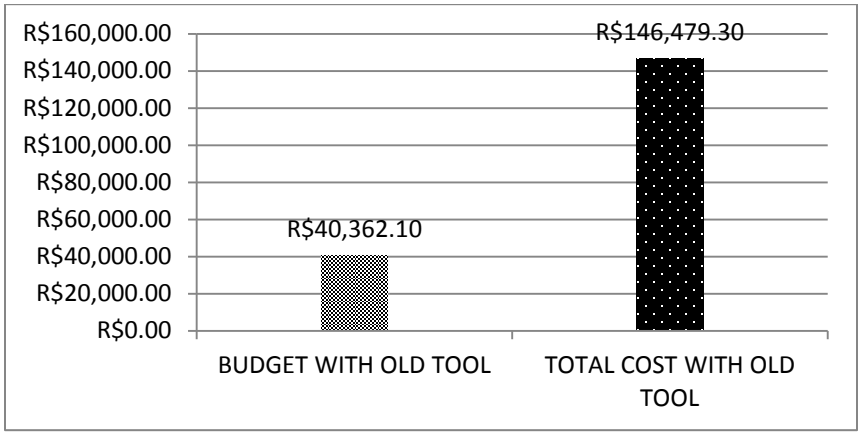


Figure 28: Results Obtained by Applying the Old Tools of Calculation during the Operation "ACISO BH 2013".

4.4 Summary

This chapter described the results obtained in this study. The final results of the Delphi Method, presented in the first section of this chapter, provided the answers to the Subsidiary Research Questions. These results were used to implement the Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems. The second section of this chapter presented a small summary of how these systems were used to create the ABC and ABB calculation models.

The ABC and ABB models were applied during a real support event (the Operation "ACISO BH 2013") to verify their applicability. The third section of this chapter presented the results obtained. The ABC model (a report of total costs) allowed calculating the total costs of this specific logistical support event. It provided the answer to the first part of the Primary Research Question, which is: How to calculate the total costs of each support event performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base, headquarters of the

Cellular Unit of Intendancy, responsible for the support? The ABB model (an excel spreadsheet that estimates the budget based on the consumption rates of activities and resource drivers and on their current values) allowed to estimate of the budget necessary to perform this specific support event. It answered the second part of the Primary Research Question which is: How to estimate the budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training? This section also presented the values obtained by the application of the old tools of calculation during the Operation “ACISO BH 2013”.

The results achieved with the implementation of the ABC and ABB models were recorded as well as the values showed by using the old tools of calculation. In the next and final chapter, these values will be compared to verify if more accurate information could be generated by the use of the new models. Based on the result of this analysis, recommendations about the future use of the models developed will be presented.

V. Analysis, Conclusions and Future Recommendations

The main objective of this study was to develop models that provide the officers with a more accurate way to calculate the following:

1.The total costs of each support performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

This purpose was achieved after four stages, presented in chapters 3 and 4:

1.Application of the Delphi Method,

2.Implementation of the Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems,

3.Development of the ABC and ABB models, and

4.Test of the ABC and ABB models of calculation.

The Delphi Method provided the answers to the Subsidiary Research Questions. The results of this technique were used to implement the Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems. After the implementation of these systems, it was possible to create the ABC and ABB models of calculation, which answered the Primary Research Question. The models developed were then applied in a real support event (the Operation “ACISO BH 2013”) to verify their applicability.

In this final chapter, the results achieved with the implementation of the ABC and ABB models will be analyzed. The first section will present a comparison between the results obtained by testing the ABC and ABB models developed and the values achieved by using the old tools of calculation used years before. The second section will present the conclusion about which approach (the use of the ABC and ABB models developed or the use of the old tolls of calculation) provides the CUI with more accurate information

about the budget and the actual total costs necessary to perform support events. This section will also provide the recommendations about the use of the models developed in future deployments. The third and final section of this chapter will present the possibilities of future research in this subject.

5.1 Analysis of Results

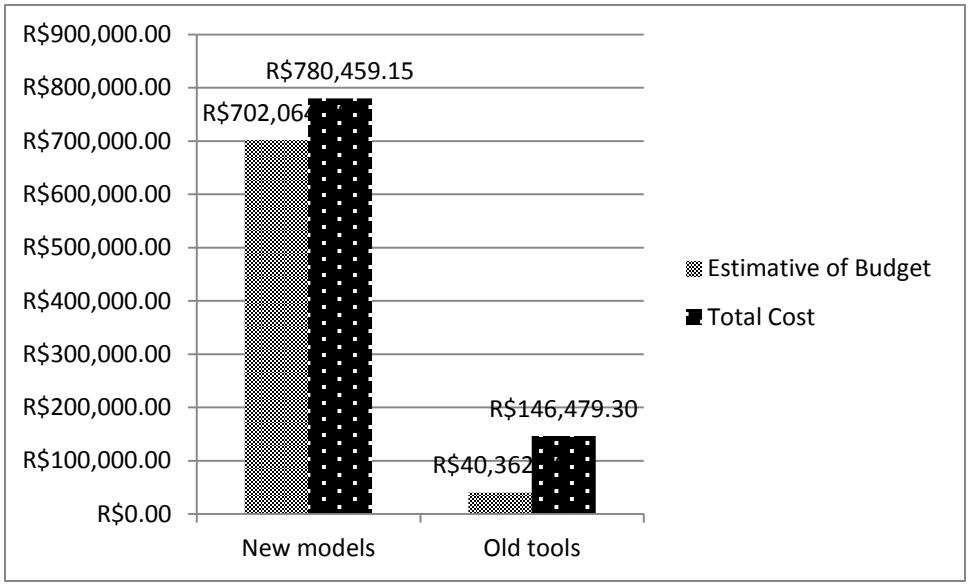
To verify their applicability, the ABC and ABB models were applied during a real support event, the Operation "ACISO BH 2013". The ABC model showed that R$780,459.15 were necessary to perform all activities and tasks. The complete ABC model (the report of total costs) for this support event can be seen at Appendix CC. The ABB model showed that R$702,064.20 would be necessary to accomplish this mission. The screens with the results of the ABB model for this support event can be seen at Appendix DD.

The old tools of calculation used in all previous years were also applied during this operation. It allowed a comparison of the results. The old tools showed that a total cost of R$ 146,479.30 was achieved with the performance of all activities and tasks, and a budget of R$ 40,362.10 would be necessary to accomplish this mission.

The values obtained by applying both approaches were compiled and they can be seen at Table 7 and Figure 29.

Table 7. Comparison between the Results Obtained by the Application of the ABC and ABB Models, and by the Application of the Old Tools of Calculation during the Operation "ACISO BH 2013".

	New models	Old tools
Estimate of Budget	R$702,064.20	R$40,362.10
Total costs	R$780,459.15	R$146,479.30
Value over budget	**R$78,394.95**	**R$106,117.20**
% over budget	**11.17%**	**262.91%**



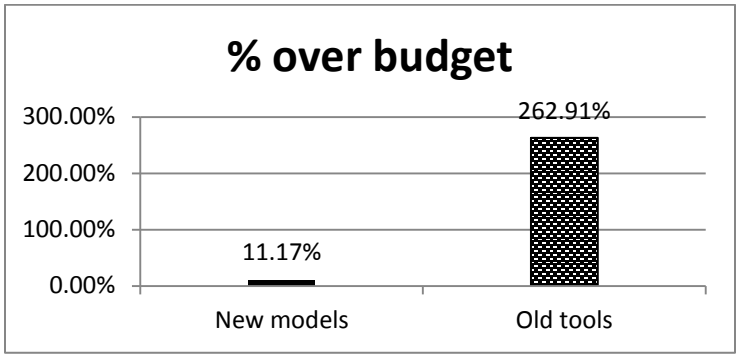


Figure 29. Comparison between Results of ABC and ABB models and Old Tools of Calculation Applied during the Operation "ACISO BH 2013".

Analyzing the results in Table 7 and Figure 29, it can be seen that the new models (ABC and ABB models) presented higher values than the old tools of calculation for the estimate of budget and for the total costs necessary to accomplish this specific mission. It is also possible to observe that the total costs are over the budget using both methods of calculation. However, the value over budget achieved with the use of the ABC and ABB models (11.17%) is much smaller when compared with the results obtained by using the old tools (262.91%).

5.2 Conclusion and Recommendations

As was related in the previous section, the use of the ABC and ABB models provided higher values than the old tools for the estimate of budget and for the total costs necessary to accomplish this specific mission. The reason for this difference was that the models developed were more detailed in terms of quantity of activities considered. While the old tools considered only a few expenses, the ABC and ABB models evaluated longer lists of expenditures. Below it can be seen how many activities were considered by the ABC and ABB models in comparison with the activities evaluated by the old tools of calculation (Table 8).

Table 8. Comparison between Quantity of Activities Considered by the ABC and ABB Models and by the Old Tools of Calculation

ABB model for budget	16	Old tool for budget	2
ABC model for total costs	31	Old tool for total costs	11

It is important to remember that the development of the lists with phases, activities and tasks necessary to track the costs and to estimate the budget was based on the recommendation given by the experts during the performance of the Delphi Method. The numbers in Table 8 show that the new models (ABC and ABB models) take into

consideration more activities to forecast the budget and to track the total costs. Consequently, more detailed lists of activities and tasks analyzed produced higher costs. In the case of this study, it represents more accurate results.

It was also possible to observe that the total actual costs recorded after the mission was higher than the cost budgeted using both methods. Unfortunately, this variance will persist in any case because during the performance of the support event many costs that could not be forecasted appear and must be considered for calculating the total costs of the mission. However, the models developed in this study provided a big reduction in the difference between the budget and the total costs after the mission when compared with the old tools of calculation. The old tools of calculation lead to total costs 262.91% over the budget, while the ABC and ABB models lead to total costs only 11.17% over the budget.

After analyzing the values obtained with the application of both approaches and explaining the main reasons to achieve those results, it is possible to present the final conclusion about which tools provide more useful information to the CUI. The ABC and ABB models developed provided more accurate results for the support event observed. The ABC model produced more accurate result of total costs and the ABB model presented a more precise estimate of budget.

The old tools of calculation presented very small values for the estimate of budget and also for the actual costs after finishing the support activity. This fact leads the decision makers to an erroneous impression that a smaller amount of financial resources was necessary to accomplishing the mission. The application of the ABC and the ABB models gave the decision makers a better understanding about how much money would

be necessary to accomplish this objective and how much money was actually spent to perform this support event.

The ABC and ABB models solved this problem by addressing the main objective of this research paper that was to develop models that provide the officers with a more accurate way to calculate the following:

1.The total costs of each support performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

Since the goal of this study was achieved, it is possible to recommend the use of these models in future deployments. The new models will allow planners (officers) to provide more precise estimate of budgets and more accurate reports of total costs, based on the cost of the activities performed in each support event. With this, the decision makers will be able to better plan the financial applications for the CUIs and to have more control of the existing resources. They will also be able to better define what support missions the CUIs will perform or not when the resources are short or some contingency is taken place, based on each estimate of budget. The CUIs will be able to provide with excellence all activities needed to maintain the well-being and the morale of the troops deployed and, consequently, help to improve the overall results of the BAF missions.

5.3 Future Research

There is potential for further researches in this area. An analysis of other scenarios, beside the standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip), could provide other models of

calculation or maybe just one more flexible model. Deployments occurring during time of conflict and deployments with a different number of people to be supported, length, and location of the camp should be analyzed. It will facilitate the task of estimating the budget and calculating the total costs in any kind of support event. It is important to point out that, in the case of analyzing different deployments scenarios, the process of chosen the experts to participate of the Delphi Method should consider their experience in the types of scenarios under examination to ensure the adequacy of their responses.

This research gives a start to other researches on this subject. Further researches can give the CUIs even more capability to help the BAF to achieve their mission during deployments. If it is possible to estimate a budget and calculate total costs for all kinds of deployments, financial resources will be better applied. It will guarantee the excellence of services provided to troops deployed and help to improve the overall success of each mission.

Appendix A: Letter of Presentation

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Currently, the estimated budget and the report of total costs for the support of the basic needs of the fighters from a military unit deployed do not reflect the reality of the CUI expenses. The estimated budget presents values much lower than those presented in the reports of total costs, prepared after finishing each support event, and the report of total costs covers only few activities performed in each support event. This fact gives the decision makers the erroneous impression that there are sufficient resources for accomplishing all objectives established.

Planners (officers) must be able to provide more precise estimates of budgets and more accurate reports of total costs, based on the cost of the activities performed in each support event. To do so, they must be able to track all activities and tasks that add cost to the process and evaluate the costs incurred in each support event.

In order to provide a viable solution to this problem, I am preparing a research work (ACTIVITY-BASED CALCULATION MODELS FOR THE BRAZILIAN AIR FORCE CELLULAR UNIT OF INTENDANCY), which aims to provide models to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

The Activity-Based Costing (ABC) and the Activity Based Budgeting (ABB) systems will be used to create the models of calculation, final result of this study.

According to Kaplan and Cooper (1997), Activity Based Costing (ABC) is a technique to assess more accurately the costs of activities performed by an organization, based on the consumption of resources used. The Activity Based Budgeting – ABB is a financial and quantitative plan that focuses on activities and resources in order to achieve strategic goals (Vanzella; Lunkes, 2006).

The implementation of these systems requires the gathering of some information about support events performed by the CUI. The data necessary will be collected using a Delphi Study. This study relies on your opinion, experts in CUI support operations. The Delphi Method is characterized by the application of the Delphi survey to a group of specialists in various rounds. At the end of each round, a statistical analysis of the results is made. The results are compiled, and they are listed in the next survey that will return to the group. Then, the experts have the opportunity to review their responses in the light of the answers of the entire group. The interactions succeed in this way until a consensus is reached.

So, I would like to request your valuable participation in this thesis, by answering some question for collecting the data needed. It will take you about 15 to 20 minutes in each round to respond the questions. The time horizon to finish the process of collecting the necessary data is established below.

Activities	**Minimum estimated time (in days)**	**Estimate limit dates**
Prepare letter of presentation	1	14 nov
Send the letter of presentation	1	15 nov
Response time	2	16 and 17 nov
Develop the first question	1	18 nov
Send the question	1	19 nov
Response time	7	20 to 26 nov
Analysis of the question 1	1	27 nov

Develop the second question	1	28 nov
Send the question	1	29 nov
Response time	7	30 nov to 5 dec
Analysis of the question 2	1	6 dec
Develop the third question	1	7 dec
Send the question	1	8 dec
Response time	7	9 to 15 dec
Analysis of the question 3	1	16 dec
Develop the fourth question	1	17 dec
Send the question	1	18 dec
Response time	7	19 a 25 dec
Analysis of the question 4	1	26 dec
Prepare and submit the final report	7	27 dec to 02 jan
Total time (in days)	**50**	**---**

It is important to emphasize that there are no right or wrong answers, being relevant only the record of your perception of the issues presented. Thus, to complete the question is only required your broad technical knowledge, acquired during the training of Planners/Operators of CUI, and your vast experience developed while performing various missions of logistical support.

The participation in this select group of specialists will secure the opportunity to learn from the consensus to be reached on the basis of opinion of members and enhance our visibility into the process of logistical support as a whole.

The models developed in this study will able the Planners (Officers) to better calculate the total costs and prepare more accurate budgets for future events of support of personnel. The use of these models will allow the decision makers to better plan the financial applications for the CUIs and to have more control of the existing resources. They will also be able to better define what support missions the CUIs will perform or not when the resources are short or some contingency is taken place, based on each estimate of budget. The CUIs will be able to provide with excellence all activities needed

to maintain the well-being and the morale of the troops deployed and, consequently, help to improve the overall results of the BAF missions.

Since now, I thank you immensely for your cooperation and I emphasize that the content of your responses will remain completely anonymous.

Mark an X in the corresponding box, confirming your participation or not.

☐ YES ☐ NO

Please, return it electronically to paulaferreira.ohio@gmail.com no later than 17 Nov 2012. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

Appendix B: Question 1 (Delphi Method) – Round 1

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and response. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At this first question, I would like to ask you to do a brainstorm and complete the following annex with as many phases, activities and tasks as you can identify as necessary to perform a complete logistical support event for the basic needs of troops deployed, during training or actual missions.

The objective is not evaluate the total costs of operations (expenses associated with the specific missions performed by the Air Units during the deployments, as, for example, air activities, hospital activities, use of weapons, etc), but analyze the elements related to the logistics cost of personnel support. So, we are going to consider only the activities under the responsibility of the CUI, specified in the Manual of CUI, namely:

a) finance;
b) provision of supplies class I-Material of Subsistence, II- Intendancy Material III- Fuels and lubricants, IV- Construction Material, VI- Engineering and Cartography Material, and X-Material not included in other classes;
c) providing consumable items;
d) surface transportation;
e) laundry service;
f) providing manpower;
g) assembly, disassembly and maintenance of the camp;
h) providing meals;

i) exploration of local resources;
j) controlling excess material;
l) collecting the material captured from the enemy;
m) repair and maintenance of intendancy material;
n) loading and unloading of material;
o) cleaning and preparation of the terrain;
p) collecting, grouping and evacuation of salvage;
q) burial and assets;
r) postal delivery;
s) recreational facilities;
t) bath, disinfection, sanitary and barber shop;
u) water supply;
v) water treatment;
x) providing electrical power.

Please, return it electronically to paulaferreira.ohio@gmail.com no later than 26 Nov 2012. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 1: Phases, activities and tasks necessary to perform a complete logistical support event for the basic needs of troops deployed, during training or actual missions

PHASE XX	
ACTIVITY	**TASKS**
PHASE XX	
ACTIVITY	**TASKS**
PHASE XX	
ACTIVITY	**TASKS**
PHASE XX	
ACTIVITY	**TASKS**

Appendix C: Answers Question 1 (Delphi Method) – Round 1

Activities	Tasks	Experts who have cited it in round 1												Total of experts who have cited it in round 1	% of experts who have cited it in round 1
		Officers						Sergeants							
		Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12		
Phase 01 - Mobilization (preparation /concentration means)															
1. Support event plan	1.1 Prepare support event plan	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
2. Authorization to perform the support	2.1 Request authorization to perform the support	x	x	x	x	x	x	-	-	x	-	x	-	**8**	**67%**
3. Precursory visit	3.1 Request authorization to perform precursory visit	x	x	x	x	x	x	-	-	x	-	x	-	**8**	**67%**
	3.2 Visit the place where the deployment will be performed	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
4. Site to build the camp	4.1 Request authorization to build the camp in the site chosen	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**
5. Manpower (Planners and Operators of CUI)	5.1 Request authorization to the Commanders/Call notice	x	x	x	x	x	-	-	-	x	-	x	-	**7**	**58%**
	5.2 Call Planners and Operators of CUI to give basic information about the support	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	5.3 Receive Planners and Operators of CUI	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
6. Material and equipment	6.1 Buy material and equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	6.2 Store material and equipment	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
	6.3 Request material or equipment from another organization	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	6.4 Transport borrowed material or equipment	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**

7. Food	7.1 Buy items to prepare and serve meals	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	7.2 Store items	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
	7.3 Produce and frozen meals	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	7.4 Store frozen meals	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
8. Special uniforms	8.1 Buy items	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
	8.2 Store items	-	x	-	x	-	-	-	-	x	-	x	-	**4**	**33%**
	8.3 Distribute items	-	x	-	x	-	-	-	-	x	-	x	-	**4**	**33%**
9. Consumable items	9.1 Buy items	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
	9.2 Store items	-	x	-	x	-	-	-	-	x	-	x	-	**4**	**33%**
10. Load material, equipment, food, manpower	10.1 Prepare material, equipment, food for shipment	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	10.2 Ship material, equipment, food at the warehouse	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**
	10.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	-	x	x	x	x	-	x	-	x	-	x	-	**7**	**58%**
11. Surface transportation	11.1 Request authorization	x	x	x	x	x	-	x	x	x	x	x	-	**10**	**83%**
	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**
	12.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	-	x	x	x	x	-	x	-	x	-	x	-	**7**	**58%**
13. Clean and prepare the terrain	13.1 Prepare the terrain to assembly the camp	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

	13.2 Check necessity of special services	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
14. Assembly the camp	14.1 Assembly tents, machines, equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
15. Finance	15.1 Payment of per diem	x	x	x	x	x	-	x	x	x	x	x	-	**10**	**83%**
	15.2 Payment of Ticket	x	x	x	x	x	-	x	x	x	x	x	-	**10**	**83%**
	15.3 Payment of purchases	-	x	x	x	x	-	x	-	x	-	x	-	**7**	**58%**
	15.4 Payment of remuneration	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
Phase 02 - Operation (logistical support through time)																
1. Manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
2. Electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
3. Treat water	3.1 Purify water	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
4. Water supply	4.1 Provide water for consumption	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
5. Bath, sanitary	5.1 Provide bathrooms	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	5.2 Keep bathrooms clean	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
6. Laundry service	6.1 Wash and dry uniforms	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
7. Communication	7.1 Provide telephony and internet	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
8. Postal service	8.1 Send mail	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
	8.2 Receive mail	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	8.3 Evaluate mail	-	x	-	x	-	-	-	-	x	-	x	-	**4**	**33%**
	8.4 Delivery mail	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
9. Recreational facilities	9.1 Provide space and activities to entertainment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
10. Consumable items	10.1 Organize items	-	x	-	x	-	-	-	-	x	-	x	-	**4**	**33%**

	10.2 Sell Items	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
	10.3 Control the money	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
11. Surface transportation	11.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
12. Maintenance of the camp (equipment, facilities)	12.1 Perform maintenance (outdoor)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
13. Intendancy material	13.1 Perform repair and maintenance (outdoor)	-	x	x	x	x	-	x	x	x	x	x	-	**9**	**75%**
14. Local resources	14.1 Explore resources	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
15. Material captured from the enemy	15.1 Collect the material	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	15.2 Store the material	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
16. Salvage	16.1 Collect material	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	16.2 Store material	-	x	x	x	-	-	-	-	x	-	x	-	**5**	**42%**
	16.3 Evacuate material	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
17. Excess material	17.1 Control material	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
18. Burial and assets	18.1 Collect bodies	x	x	x	x	x	x	x	x	x	x	x	-	**11**	**92%**
	18.2 Bury bodies	x	x	x	x	x	x	x	x	x	x	x	-	**11**	**92%**
	18.3 Collect belongings	x	x	x	x	x	x	x	x	x	x	x	-	**11**	**92%**
	18.4 Store belongings	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	18.5 Evacuate bodies and belongings	x	x	x	x	x	x	x	x	x	x	x	-	**11**	**92%**
19. Disinfection	19.1 Provide material for disinfection	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	19.2 Provide new uniforms	x	x	x	x	x	x	x	x	x	x	x	-	**11**	**92%**
	19.3 Dispose infected material	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
20. Resupply	20.1 Prepare material, equipment, food for shipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	20.2 Transport material, equipment, food	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

21. Finance	21.1 Payment of remuneration	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
	21.2 Payment of purchases	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	21.3 Payment of contracts	-	x	x	x	x	-	x	-	x	-	x	-	**7**	**58%**
Phase 03 - Demobilization (recovery of personnel and materials)																
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	2.2 Ship material, equipment, food at the warehouse	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	-	x	x	x	x	-	x	-	x	-	x	-	**7**	**58%**
3. Clean and prepare the terrain	3.1 Clean the terrain after mission	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	3.2 Check necessity of special services	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
4. Surface transportation	4.1 Request authorization	x	x	x	x	x	-	x	x	x	x	x	-	**10**	**83%**
	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	-	x	x	x	x	-	x	-	x	-	x	-	**7**	**58%**
6. Manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	6.2 Report performance of Planners and Operators of CUI to respective Commanders	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
7. Intendancy material	7.1 Perform repair and maintenance (outdoor)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

	7.2 Store material and equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	7.3 Return material or equipment borrowed from another organization	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	7.4 Transport borrowed material or equipment	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
8. Finance	8.1 Payment of per diem	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**
	8.2 Payment of tickets	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**
	8.3 Payment of contracts	x	x	x	x	x	-	x	x	x	-	x	-	**9**	**75%**

Appendix D: Question 1 (Delphi Method) – Round 2

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 1 – round 1. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the first round of question 1, you have done a brainstorm and filled the annex 01 with phases, activities, tasks and related cost drivers that you have identified as necessary to perform a complete logistical support event for the basic needs of troops deployed, during training or actual missions.

At this moment (round 2), I would like to ask you to analyze the summary of all experts' answers (Annex 2). Please, add other suggestions to the list, if you have. If you consider that any activity or task cited should not be considered, please, explain why. If you consider that the list is completed, please, let me know.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 2: Question 1 (Round 1) - Summary of all experts' answers

Activities	Tasks	Total of experts who have cited it in round 1	% of experts who have cited it in round 1
Phase 01 - Mobilization (preparation /concentration means)			
1. Support event plan	1.1 Prepare support event plan	**12**	**100%**
2. Authorization to perform the support	2.1 Request authorization to perform the support	**8**	**67%**
3. Precursory visit	3.1 Request authorization to perform precursory visit	**8**	**67%**
	3.2 Visit the place where the deployment will be performed	**12**	**100%**
4. Site to build the camp	4.1 Request authorization to build the camp in the site chosen	**9**	**75%**
5. Manpower (Planners and Operators of CUI)	5.1 Request authorization to the Commanders/Call notice	**7**	**58%**
	5.2 Call Planners and Operators of CUI to give basic information about the support	**12**	**100%**
	5.3 Receive Planners and Operators of CUI	**12**	**100%**
6. Material and equipment	6.1 Buy material and equipment	**12**	**100%**
	6.2 Store material and equipment	**5**	**42%**
	6.3 Request material or equipment from another organization	**6**	**50%**
	6.4 Transport borrowed material or equipment	**6**	**50%**
7. Food	7.1 Buy items to prepare and serve meals	**12**	**100%**
	7.2 Store items	**5**	**42%**
	7.3 Produce and frozen meals	**12**	**100%**
	7.4 Store frozen meals	**5**	**42%**
8. Special uniforms	8.1 Buy items	**5**	**42%**
	8.2 Store items	**4**	**33%**
	8.3 Distribute items	**4**	**33%**
9. Consumable items	9.1 Buy items	**5**	**42%**
	9.2 Store items	**4**	**33%**
10. Load material, equipment, food, manpower	10.1 Prepare material, equipment, food for shipment	**6**	**50%**
	10.2 Ship material, equipment, food at the warehouse	**9**	**75%**
	10.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	**7**	**58%**

11. Surface transportation	11.1 Request authorization	**10**	**83%**
	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	**12**	**100%**
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2	**9**	**75%**
	12.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	**7**	**58%**
13. Clean and prepare the terrain	13.1 Prepare the terrain to assembly the camp	**12**	**100%**
	13.2 Check necessity of special services	**6**	**50%**
14. Assembly the camp	14.1 Assembly tents, machines, equipment	**12**	**100%**
15. Finance	15.1 Payment of per diem	**10**	**83%**
	15.2 Payment of Ticket	**10**	**83%**
	15.3 Payment of purchases	**7**	**58%**
	15.4 Payment of remuneration	**8**	**67%**
Phase 02 - Operation (logistical support through time)			
1. Manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	**12**	**100%**
2. Electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	**12**	**100%**
3. Treat water	3.1 Purify water	**8**	**67%**
4. Water supply	4.1 Provide water for consumption	**12**	**100%**
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	**12**	**100%**
5. Bath, sanitary	5.1 Provide bathrooms	**12**	**100%**
	5.2 Keep bathrooms clean	**8**	**67%**
6. Laundry service	6.1 Wash and dry uniforms	**12**	**100%**
7. Communication	7.1 Provide telephony and internet	**8**	**67%**
8. Postal service	8.1 Send mail	**8**	**67%**
	8.2 Receive mail	**6**	**50%**
	8.3 Evaluate mail	**4**	**33%**
	8.4 Delivery mail	**6**	**50%**
9. Recreational facilities	9.1 Provide space and activities to entertainment	**12**	**100%**
10. Consumable items	10.1 Organize items	**4**	**33%**
	10.2 Sell Items	**5**	**42%**
	10.3 Control the money	**5**	**42%**

11. Surface transportation	11.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	**12**	**100%**
12. Maintenance of the camp (equipment, facilities)	12.1 Perform maintenance (outdoor)	**12**	**100%**
13. Intendancy material	13.1 Perform repair and maintenance (outdoor)	**9**	**75%**
14. Local resources	14.1 Explore resources	**6**	**50%**
15. Material captured from the enemy	15.1 Collect the material	**6**	**50%**
	15.2 Store the material	**6**	**50%**
16. Salvage	16.1 Collect material	**6**	**50%**
	16.2 Store material	**5**	**42%**
	16.3 Evacuate material	**6**	**50%**
17. Excess material	17.1 Control material	**6**	**50%**
18. Burial and assets	18.1 Collect bodies	**11**	**92%**
	18.2 Bury bodies	**11**	**92%**
	18.3 Collect belongings	**11**	**92%**
	18.4 Store belongings	**6**	**50%**
	18.5 Evacuate bodies and belongings	**11**	**92%**
19. Disinfection	19.1 Provide material for disinfection	**6**	**50%**
	19.2 Provide new uniforms	**11**	**92%**
	19.3 Dispose infected material	**6**	**50%**
20. Resupply	20.1 Prepare material, equipment, food for shipment	**12**	**100%**
	20.2 Transport material, equipment, food	**12**	**100%**
21. Finance	21.1 Payment of remuneration	**8**	**67%**
	21.2 Payment of purchases	**6**	**50%**
	21.3 Payment of contracts	**7**	**58%**
Phase 03 - Demobilization (recovery of personnel and materials)			
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	**12**	**100%**
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	**12**	**100%**
	2.2 Ship material, equipment, food at the warehouse	**9**	**75%**
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	**7**	**58%**
3. Clean and prepare the terrain	3.1 Clean the terrain after mission	**12**	**100%**
	3.2 Check necessity of special services	**6**	**50%**
4. Surface transportation	4.1 Request authorization	**10**	**83%**

	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	**12**	**100%**
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	**9**	**75%**
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	**7**	**58%**
6. Manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	**12**	**100%**
	6.2 Report performance of Planners and Operators of CUI to respective Commanders	**6**	**50%**
7. Intendancy material	7.1 Perform repair and maintenance (outdoor)	**12**	**100%**
	7.2 Store material and equipment	**12**	**100%**
	7.3 Return material or equipment borrowed from another organization	**6**	**50%**
	7.4 Transport borrowed material or equipment	**6**	**50%**
8. Finance	8.1 Payment of per diem	**9**	**75%**
	8.2 Payment of tickets	**9**	**75%**
	8.3 Payment of contracts	**9**	**75%**

Appendix E: Final Result of Question 1

List of phases, activities and tasks necessary to perform a complete logistical support event for the basic needs of troops deployed, during training or actual missions

Activities	Tasks
Phase 01 - Mobilization (preparation /concentration means)	
1. Prepare support event plan	1.1 Prepare support event plan
2. Request authorization to perform the support	2.1 Request authorization to perform the support
3. Perform precursory visit	3.1 Request authorization to perform precursory visit
	3.2 Visit the place where the deployment will be performed
4. Chose the site to build the camp	4.1 Request authorization to build the camp in the site chosen
5. Provide manpower (Planners and Operators of CUI)	5.1 Request authorization to the Commanders/Call notice
	5.2 Call Planners and Operators of CUI to give basic information about the support
	5.3 Receive Planners and Operators of CUI
6. Provide material and equipment	6.1 Buy material and equipment
	6.2 Store material and equipment
	6.3 Request material or equipment from another organization
	6.4 Transport borrowed material or equipment
7. Provide food	7.1 Buy items to prepare and serve meals
	7.2 Store items
	7.3 Produce and frozen meals
	7.4 Store frozen meals
8. Provide special uniforms	8.1 Buy items
	8.2 Store items
	8.3 Distribute items
9. Provide consumable items	9.1 Buy items
	9.2 Store items
10. Load material, equipment, food, manpower	10.1 Prepare material, equipment, food for shipment
	10.2 Ship material, equipment, food at the warehouse
	10.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1
11. Provide surface transportation	11.1 Request authorization
	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2
	12.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area

13. Clean and prepare the terrain	13.1 Prepare the terrain to assembly the camp
	13.2 Check necessity of special services
14. Assembly the camp	14.1 Assembly tents, machines, equipment
15. Provide financial support	15.1 Payment of per diem
	15.2 Payment of Ticket
	15.3 Payment of purchases
	15.4 Payment of remuneration
Phase 02 - Operation (logistical support through time)	
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower
3. Treat water	3.1 Purify water
4. Provide water supply	4.1 Provide water for consumption
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)
5. Provide bath, sanitary	5.1 Provide bathrooms
	5.2 Keep bathrooms clean
6. Provide laundry service	6.1 Wash and dry uniforms
7. Provide communication	7.1 Provide telephony and internet
8. Provide postal service	8.1 Send mail
	8.2 Receive mail
	8.3 Evaluate mail
	8.4 Delivery mail
9. Provide recreational facilities	9.1 Provide space and activities to entertainment
10. Provide consumable items	10.1 Organize items
	10.2 Sell Items
	10.3 Control the money
11. Provide surface transportation	11.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)
12. Perform maintenance of the camp (equipment, facilities)	12.1 Perform maintenance (outdoor)
13. Repair and maintain intendancy material	13.1 Perform repair and maintenance (outdoor)
14. Explore local resources	14.1 Explore resources
15. Collect the material captured from the enemy	15.1 Collect the material
	15.2 Store the material
16. Collect, group and evacuate salvage	16.1 Collect material
	16.2 Store material
	16.3 Evacuate material
17. Control excess material	17.1 Control material
18. Perform burial and control assets	18.1 Collect bodies
	18.2 Bury bodies
	18.3 Collect belongings

	18.4 Store belongings
	18.5 Evacuate bodies and belongings
19. Perform disinfection	19.1 Provide material for disinfection
	19.2 Provide new uniforms
	19.3 Dispose infected material
20. Provide resupply	20.1 Prepare material, equipment, food for shipment
	20.2 Transport material, equipment, food
21. Provide financial support	21.1 Payment of remuneration
	21.2 Payment of purchases
	21.3 Payment of contracts
Phase 03 - Demobilization (recovery of personnel and materials)	
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment
	2.2 Ship material, equipment, food at the warehouse
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1
3. Clean and prepare the terrain	3.1 Clean the terrain after mission
	3.2 Check necessity of special services
4. Provide surface transportation	4.1 Request authorization
	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI
	6.2 Report performance of Planners and Operators of CUI to respective Commanders
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)
	7.2 Store material and equipment
	7.3 Return material or equipment borrowed from another organization
	7.4 Transport borrowed material or equipment
8. Provide financial support	8.1 Payment of per diem
	8.2 Payment of tickets
	8.3 Payment of contracts

Appendix F: Question 2 (Delphi Method) – Round 1

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 1. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the first round of question 2, I would like to ask you to select from the Final Result of Question 1 only the activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support). I also would like to ask you to identify the cost drivers of each one of them.

Please, return it electronically to paulaferreira.ohio@gmail.com no later than 05 Dec 2012. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

Appendix G: Answers Question 2 (Delphi Method) – Round 1

Round 1																
Activities	**Tasks**	**Cost Drivers**	**Officers**						**Sergeants**						**Total of experts who have cited it in round 1**	**% of experts who have cited it in round 1**
			Expert 1	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Expert 6**	**Expert 7**	**Expert 8**	**Expert 9**	**Expert 10**	**Expert 11**	**Expert 12**		
Phase 01 - Mobilization (preparation /concentration means)																
3. Perform precursory visit	3.2 Visit the place where the deployment will be performed	Per diem	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
		Ticket price (round trip)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
		Fuel costs (flight hours or km/L) if military transport	-	x	x	x	x	-	x	x	x	x	x	-	**9**	**75%**
5. Provide manpower (Planners and Operators of CUI)	5.3 Receive Planners and Operators of CUI	Per diem during preparation of material	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
		Ticket price (Air Base of origin to warehouse)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
		Fuel costs (flight hours or km/L) if military transport	-	x	x	x	x	-	x	x	x	x	x	-	**9**	**75%**
6. Provide material and equipment	6.1 Buy material and equipment	Total costs of purchases	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	6.4 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	-	x	x	x	x	-	x	x	x	x	x	-	**9**	**75%**
7. Provide food	7.1 Buy items to prepare and serve meals	Total costs of purchases	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
8. Provide special uniforms	8.1 Buy items	Total costs of purchases	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

10. Load material, equipment, food, manpower	10.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
11. Provide surface transportation	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	12.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)	-	x	-	x	-	-	x	-	x	-	-	-	**4**	**33%**
13. Clean and prepare the terrain	13.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)	-	x	x	x	-	-	x	x	x	x	x	x	**9**	**75%**
<u>Phase 02 - Operation (logistical support through time)</u>																	
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
6. Provide laundry service	6.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
7. Provide communication	7.1 Provide telephony and internet	Value of contracts	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**
8. Provide postal service	8.1 Send mail	Value of contract with postal company	-	x	-	x	-	-	-	-	x	-	-	-	**3**	**25%**
11. Provide surface transportation	11.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
12. Perform maintenance of the camp (equipment, facilities)	12.1 Perform maintenance (outdoor)	Total value of each contract	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

13. Repair and maintain intendancy material	13.1 Perform repair and maintenance (outdoor)	Total value of each contract	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
18. Perform burial and control assets	18.5 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
20. Provide resupply	20.1 Prepare material, equipment, food for shipment	Packing Costs	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**
		Cost of renting ground support equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	20.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
21. Provide financial support	21.1 Payment of remuneration	Per diem to go to the place of mission	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
		Ticket price (round trip)	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
		Fuel costs (flight hours or km/L) if military transport	-	x	x	x	-	-	-	-	x	-	-	-	**4**	**33%**
Phase 03 - Demobilization (recovery of personnel and materials)																	
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**
	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
4. Provide surface transportation	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel costs (flight hours or km/L) if military transport	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	-	x	x	x	x	-	x	x	x	x	x	x	**10**	**83%**
		Ticket price (warehouse to Air Base of origin)	-	x	x	x	x	-	x	x	x	x	x	x	**10**	**83%**
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
	7.4 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	-	x	-	x	-	-	-	-	x	-	-	-	**3**	**25%**

Appendix H: Question 2 (Delphi Method) – Round 2

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 2 – round 1. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the first round of question 2, you have selected from the Final Result of Question 1 only the activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support). You have also identified the cost drivers of each one of them.

At this moment (round 2), I would like to ask you to analyze the summary of all experts' answers (Annex 3). Please, add other suggestions to the list, if you have. If you consider that any activity or task cited should not be considered, please, explain why. If you consider that the list is completed, please, let me know.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 3: Question 2 (Round 1) - Summary of all experts' answers

Activities	Tasks	Cost Drivers	Round 1	
			Total of experts who have cited it in round 1	% of experts who have cited it in round 1
Phase 01 - Mobilization (preparation /concentration means)				
3. Perform precursory visit	3.2 Visit the place where the deployment will be performed	Per diem	**12**	**100%**
		Ticket price (round trip)	**12**	**100%**
		Fuel costs (flight hours or km/L) if military transport	**9**	**75%**
5. Provide manpower (Planners and Operators of CUI)	5.3 Receive Planners and Operators of CUI	Per diem during preparation of material	**12**	**100%**
		Ticket price (Air Base of origin to warehouse)	**12**	**100%**
		Fuel costs (flight hours or km/L) if military transport	**9**	**75%**
6. Provide material and equipment	6.1 Buy material and equipment	Total costs of purchases	**12**	**100%**
	6.4 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	**9**	**75%**
7. Provide food	7.1 Buy items to prepare and serve meals	Total costs of purchases	**12**	**100%**
8. Provide special uniforms	8.1 Buy items	Total costs of purchases	**12**	**100%**
10. Load material, equipment, food, manpower	10.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment	**12**	**100%**
11. Provide surface transportation	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport	**12**	**100%**
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	**12**	**100%**

	12.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)	**4**	**33%**
13. Clean and prepare the terrain	13.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)	**9**	**75%**
Phase 02 - Operation (logistical support through time)				
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	**12**	**100%**
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)	**8**	**67%**
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)	**8**	**67%**
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)	**12**	**100%**
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)	**6**	**50%**
6. Provide laundry service	6.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)	**12**	**100%**
7. Provide communication	7.1 Provide telephony and internet	Value of contracts	**5**	**42%**
8. Provide postal service	8.1 Send mail	Value of contract with postal company	**3**	**25%**
11. Provide surface transportation	11.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)	**12**	**100%**
12. Perform maintenance of the camp (equipment, facilities)	12.1 Perform maintenance (outdoor)	Total value of each contract	**12**	**100%**
13. Repair and maintain intendancy material	13.1 Perform repair and maintenance (outdoor)	Total value of each contract	**12**	**100%**
18. Perform burial and control assets	18.5 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport	**6**	**50%**

20. Provide resupply	20.1 Prepare material, equipment, food for shipment	Packing Costs	**5**	**42%**
		Cost of renting ground support equipment	**12**	**100%**
	20.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport	**12**	**100%**
21. Provide financial support	21.1 Payment of remuneration	Per diem to go to the place of mission	**8**	**67%**
		Ticket price (round trip)	**8**	**67%**
		Fuel costs (flight hours or km/L) if military transport	**4**	**33%**
Phase 03 - Demobilization (recovery of personnel and materials)				
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs	**5**	**42%**
	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment	**12**	**100%**
3. Clean and prepare the terrain	3.2 Check necessity of special services	Total costs of service (earthwork, etc)	**0**	**0%**
4. Provide surface transportation	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel costs (flight hours or km/L) if military transport	**12**	**100%**
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	**12**	**100%**
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	**10**	**83%**
		Ticket price (warehouse to Air Base of origin)	**10**	**83%**
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract	**12**	**100%**
	7.4 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	**3**	**25%**

Appendix I: Answers Question 2 (Delphi Method) – Round 2

Round 2																	
Activities	**Tasks**	**Cost Drivers**	**Officers**						**Sergeants**						**Total of experts who have added it to their previous answer in round 2**	**% of experts who have added it to their previous answer in round 2**
			Expert 1	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Expert 6**	**Expert 7**	**Expert 8**	**Expert 9**	**Expert 10**	**Expert 11**	**Expert 12**		
Phase 01 - Mobilization (preparation /concentration means)																
3. Perform precursory visit	3.2 Visit the place where the deployment will be performed	Per diem for crew if military airplane	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
		Per diem for drivers if military truck	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
5. Provide manpower (Planners and Operators of CUI)	5.3 Receive Planners and Operators of CUI	Per diem for crew if military airplane	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
		Per diem for drivers if military truck	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
6. Provide material and equipment	6.4 Transport borrowed material or equipment	Per diem for crew if military airplane	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
		Per diem for drivers if military truck	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
10. Load material, equipment, food, manpower	10.1 Prepare material, equipment, food for shipment	Packing Costs	-	x	-	x	-	-	-	-	x	-	-	-	**3**	**25%**
	10.2 Ship material, equipment, food at the warehouse	Fuel costs to operate ground support equipment	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**

	10.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	Fuel costs (military truck)	-	x	-	x	-	-	x	x	x	-	-	-	**5**	**42%**
11. Provide surface transportation	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Per diem for crew if military airplane	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
		Per diem for drivers if military truck	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2	Fuel costs to operate ground support equipment	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**
13. Clean and prepare the terrain	13.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	-	x	-	x	-	-	x	-	x	-	-	-	**4**	**33%**
14. Assembly the camp	14.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	-	x	-	x	-	-	x	-	x	-	-	-	**4**	**33%**
Phase 02 - Operation (logistical support through time)																
8. Provide postal service	8.1 Send mail	Fuel costs (flight hours or km/L) if military transport	-	x	-	x	-	-	-	-	x	-	-	-	**3**	**25%**
		Per diem for crew if military airplane	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
		Per diem for drivers if military truck	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
16. Collect, group and evacuate salvage	16.3 Evacuate material	Fuel costs (flight hours or km/L) if military transport	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**

		Per diem for crew if military airplane	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
		Per diem for drivers if military truck	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
18. Perform burial and control assets	18.5 Evacuate bodies and belongings	Per diem for crew if military airplane	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
		Per diem for drivers if military truck	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
20. Provide resupply	20.1 Prepare material, equipment, food for shipment	Fuel costs to operate ground support equipment	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	20.2 Transport material, equipment, food	Per diem for crew if military airplane	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
		Per diem for drivers if military truck	-	x	x	x	x	-	-	-	x	x	-	-	**6**	**50%**
21. Provide financial support	21.1 Payment of remuneration	Per diem for crew if military airplane	-	x	-	-	-	-	-	-	x	-	-	-	**2**	**17%**
		Per diem for drivers if military truck	-	x	-	-	-	-	-	-	x	-	-	-	**2**	**17%**
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
Phase 03 - Demobilization (recovery of personnel and materials)																
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	-	x	-	x	-	-	x	-	x	-	-	-	**4**	**33%**
2. Load material, equipment, food, manpower	2.2 Ship material, equipment, food at the camp area	Fuel costs to operate ground support equipment	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**

	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	Fuel costs (military truck)	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**
3. Clean and prepare the terrain	3.2 Check necessity of special services	Total costs of service (earthwork, etc)	-	x	-	x	-	-	-	-	x	-	-	x	**4**	**33%**
4. Provide surface transportation	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Per diem for crew if military airplane	-	x	x	x	x	-	x	x	x	x	x	-	**9**	**75%**
		Per diem for drivers if military truck	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Fuel costs to operate ground support equipment	-	x	x	x	x	-	-	-	x	-	-	-	**5**	**42%**
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	Fuel costs (military truck)	-	x	-	x	-	-	-	-	x	-	-	-	**3**	**25%**
7. Repair and maintain intendancy material	7.2 Store material and equipment	Depreciation costs of material and equipment	-	x	x	x	x	-	-	-	x	-	x	-	**6**	**50%**
	7.4 Transport borrowed material or equipment	Per diem for crew if military airplane	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**
		Per diem for drivers if military truck	-	x	-	x	-	-	-	-	-	-	-	-	**2**	**17%**

Appendix J: Question 2 (Delphi Method) – Round 3

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 2 – rounds 1 and 2. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the second round of question 2, you have analyzed the summary of all experts' answers. At this moment (round 3), please, evaluate the new summary of all experts' answers (Annex 4) and add other suggestions to the list, if you have. If you consider that any activity or task cited should not be considered, please, explain why. If you consider that the list is completed, please, let me know.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 4: Question 2 (Rounds 1 and 2) - Summary of all experts' answers

Activities	Tasks	Cost Drivers	Round 1		Round 2	
			Total of experts who have cited it in round 1	% of experts who have cited it in round 1	Total of experts who have added it to their previous answer in round 2	% of experts who have added it to their previous answer in round 2
Phase 01 - Mobilization (preparation /concentration means)						
3. Perform precursory visit	3.2 Visit the place where the deployment will be performed	Per diem	**12**	**100%**	**0**	**0%**
		Ticket price (round trip)	**12**	**100%**	**0**	**0%**
		Fuel costs (flight hours or km/L) if military transport	**9**	**75%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**6**	**50%**
		Per diem for drivers if military truck	**0**	**0%**	**6**	**50%**
5. Provide manpower (Planners and Operators of CUI)	5.3 Receive Planners and Operators of CUI	Per diem during preparation of material	**12**	**100%**	**0**	**0%**
		Ticket price (Air Base of origin to warehouse)	**12**	**100%**	**0**	**0%**
		Fuel costs (flight hours or km/L) if military transport	**9**	**75%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**6**	**50%**
		Per diem for drivers if military truck	**0**	**0%**	**6**	**50%**
6. Provide material and equipment	6.1 Buy material and equipment	Total costs of purchases	**12**	**100%**	**0**	**0%**
	6.4 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	**9**	**75%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**6**	**50%**
		Per diem for drivers if military truck	**0**	**0%**	**6**	**50%**
7. Provide food	7.1 Buy items to prepare and serve meals	Total costs of purchases	**12**	**100%**	**0**	**0%**
8. Provide special uniforms	8.1 Buy items	Total costs of purchases	**12**	**100%**	**0**	**0%**

10. Load material, equipment, food, manpower	10.1 Prepare material, equipment, food for shipment	Packing Costs	**0**	**0%**	**3**	**25%**
	10.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment	**12**	**100%**	**0**	**0%**
		Fuel costs to operate ground support equipment	**0**	**0%**	**5**	**42%**
	10.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	Fuel costs (military truck)	**0**	**0%**	**5**	**42%**
11. Provide surface transportation	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport	**12**	**100%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**6**	**50%**
		Per diem for drivers if military truck	**0**	**0%**	**6**	**50%**
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	**12**	**100%**	**0**	**0%**
		Fuel costs to operate ground support equipment	**0**	**0%**	**5**	**42%**
	12.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)	**4**	**33%**	**0**	**0%**
13. Clean and prepare the terrain	13.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	**0**	**0%**	**4**	**33%**
	13.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)	**9**	**75%**	**0**	**0%**
14. Assembly the camp	14.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	**0**	**0%**	**4**	**33%**

Phase 02 - Operation (logistical support through time)						
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	**12**	**100%**	**0**	**0%**
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)	**8**	**67%**	**0**	**0%**
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)	**8**	**67%**	**0**	**0%**
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)	**12**	**100%**	**0**	**0%**
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)	**6**	**50%**	**0**	**0%**
6. Provide laundry service	6.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)	**12**	**100%**	**0**	**0%**
7. Provide communication	7.1 Provide telephony and internet	Value of contracts	**5**	**42%**	**0**	**0%**
8. Provide postal service	8.1 Send mail	Value of contract with postal company	**3**	**25%**	**0**	**0%**
		Fuel costs (flight hours or km/L) if military transport	**0**	**0%**	**3**	**25%**
		Per diem for crew if military airplane	**0**	**0%**	**2**	**17%**
		Per diem for drivers if military truck	**0**	**0%**	**2**	**17%**
11. Provide surface transportation	11.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)	**12**	**100%**	**0**	**0%**
12. Perform maintenance of the camp (equipment, facilities)	12.1 Perform maintenance (outdoor)	Total value of each contract	**12**	**100%**	**0**	**0%**
13. Repair and maintain intendancy material	13.1 Perform repair and maintenance (outdoor)	Total value of each contract	**12**	**100%**	**0**	**0%**

16. Collect, group and evacuate salvage	16.3 Evacuate material	Fuel costs (flight hours or km/L) if military transport	**0**	**0%**	**6**	**50%**
		Per diem for crew if military airplane	**0**	**0%**	**2**	**17%**
		Per diem for drivers if military truck	**0**	**0%**	**2**	**17%**
18. Perform burial and control assets	18.5 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport	**6**	**50%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**2**	**17%**
		Per diem for drivers if military truck	**0**	**0%**	**2**	**17%**
20. Provide resupply	20.1 Prepare material, equipment, food for shipment	Packing Costs	**5**	**42%**	**0**	**0%**
		Cost of renting ground support equipment	**12**	**100%**	**0**	**0%**
		Fuel costs to operate ground support equipment	**0**	**0%**	**6**	**50%**
	20.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport	**12**	**100%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**6**	**50%**
		Per diem for drivers if military truck	**0**	**0%**	**6**	**50%**
21. Provide financial support	21.1 Payment of remuneration	Per diem to go to the place of mission	**8**	**67%**	**0**	**0%**
		Ticket price (round trip)	**8**	**67%**	**0**	**0%**
		Fuel costs (flight hours or km/L) if military transport	**4**	**33%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**2**	**17%**
		Per diem for drivers if military truck	**0**	**0%**	**2**	**17%**
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	**0**	**0%**	**2**	**17%**
Phase 03 - Demobilization (recovery of personnel and materials)						
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	**0**	**0%**	**4**	**33%**
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs	**5**	**42%**	**0**	**0%**

	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment	**12**	**100%**	**0**	**0%**
		Fuel costs to operate ground support equipment	**0**	**0%**	**5**	**42%**
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	Fuel costs (military truck)	**0**	**0%**	**5**	**42%**
3. Clean and prepare the terrain	3.2 Check necessity of special services	Total costs of service (earthwork, etc)	**0**	**0%**	**4**	**33%**
4. Provide surface transportation	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel costs (flight hours or km/L) if military transport	**12**	**100%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**6**	**50%**
		Per diem for drivers if military truck	**0**	**0%**	**6**	**50%**
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	**12**	**100%**	**0**	**0%**
		Fuel costs to operate ground support equipment	**0**	**0%**	**5**	**42%**
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	Fuel costs (military truck)	**0**	**0%**	**3**	**25%**
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	**10**	**83%**	**0**	**0%**
		Ticket price (warehouse to Air Base of origin)	**10**	**83%**	**0**	**0%**
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract	**12**	**100%**	**0**	**0%**
	7.2 Store material and equipment	Depreciation costs of material and equipment	**0**	**0%**	**6**	**50%**
	7.4 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	**3**	**25%**	**0**	**0%**
		Per diem for crew if military airplane	**0**	**0%**	**2**	**17%**
		Per diem for drivers if military truck	**0**	**0%**	**2**	**17%**

Appendix K: Final Result of Question 2

List of activities, tasks and their related cost drivers that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support)

Activities	Tasks	Cost Drivers
Phase 01 - Mobilization (preparation /concentration means)		
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem
		Ticket price (round trip)
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material
		Ticket price (Air Base of origin to warehouse)
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
3. Provide material and equipment	3.1 Buy material and equipment	Total costs of purchases
	3.2 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
4. Provide food	4.1 Buy items to prepare and serve meals	Total costs of purchases
5. Provide special uniforms	5.1 Buy items	Total costs of purchases
6. Load material, equipment, food, manpower	6.1 Prepare material, equipment, food for shipment	Packing Costs
	6.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	6.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	Fuel costs (military truck)
7. Provide surface transportation	7.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck

8. Unload material, equipment, food, manpower	8.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	8.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)
9. Clean and prepare the terrain	9.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared
	9.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)
10. Assembly the camp	10.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled
Phase 02 - Operation (logistical support through time)		
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)
5. Provide laundry service	5.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)
6. Provide communication	6.1 Provide telephony and internet	Value of contracts
7. Provide postal service	7.1 Send mail	Value of contract with postal company
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
8. Provide surface transportation	8.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)
9. Perform maintenance of the camp (equipment, facilities)	9.1 Perform maintenance (outdoor)	Total value of each contract
10. Repair and maintain intendancy material	10.1 Perform repair and maintenance (outdoor)	Total value of each contract
11. Collect, group and evacuate salvage	11.1 Evacuate material	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck

12. Perform burial and control assets	12.1 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
13. Provide resupply	13.1 Prepare material, equipment, food for shipment	Packing Costs
		Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	13.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
14. Provide financial support	14.1 Payment of remuneration	Per diem to go to the place of mission
		Ticket price (round trip)
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)
Phase 03 - Demobilization (recovery of personnel and materials)		
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs
	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	Fuel costs (military truck)
3. Clean and prepare the terrain	3.1 Check necessity of special services	Total costs of service (earthwork, etc)
4. Provide surface transportation	4.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	Fuel costs (military truck)

6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material
		Ticket price (warehouse to Air Base of origin)
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract
	7.2 Store material and equipment	Depreciation costs of material and equipment
	7.3 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck

Appendix L: Question 3 (Delphi Method) – Round 1

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 1 and 2. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the first round of question 3, I would like to ask you to select from the Final Result of Question 2 only the phases, activities and tasks that you consider to be useful to estimate the budget of support events. Relate each task to specifics resource drivers.

Please, return it electronically to paulaferreira.ohio@gmail.com no later than 15 Dec 2012. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

Appendix M: Answers Question 3 (Delphi Method) – Round 1

Round 1																
Activities	**Tasks**	**Resource Drivers**	**Officers**						**Sergeants**						**Total of experts who have cited it in round 1**	**% of experts who have cited it in round 1**
			Expert 1	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Expert 6**	**Expert 7**	**Expert 8**	**Expert 9**	**Expert 10**	**Expert 11**	**Expert 12**		
Phase 01 - Mobilization (preparation /concentration means)																
1. Perform precursory visit	1.2 Visit the place where the deployment will be performed	Per diem	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
		Ticket (round trip)	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
2. Provide manpower (Planners and Operators of CUI)	2.3 Receive Planners and Operators of CUI	Per diem during preparation of material	-	x	x	x	x	-	x	x	x	x	x	-	**9**	**75%**
3. Provide material and equipment	3.1 Buy material and equipment	Purchases	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
4. Provide food	4.1 Buy items to prepare and serve meals	Purchases	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
7. Provide surface transportation	7.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Flight hours or km/L if military transport	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

9. Clean and prepare the terrain	9.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	-	x	-	x	-	-	x	-	x	-	-	-	**4**	**33%**
10. Assembly the camp	10.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	-	x	-	x	-	-	x	-	x	-	-	-	**4**	**33%**
Phase 02 - Operation (logistical support through time)																
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
4. Provide water supply	4.1 Provide water for consumption	Water for consumption	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
8. Provide surface transportation	8.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	-	x	x	x	x	-	x	x	x	x	x	x	**10**	**83%**
13. Provide resupply	13.2 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**

14. Provide financial support	14.1 Payment of remuneration	Per diem to go to the place of mission	-	x	x	x	x	-	x	x	x	-	x	-	**8**	**67%**
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
Phase 03 - Demobilization (recovery of personnel and materials)																
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
4. Provide surface transportation	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	x	x	x	x	x	x	x	x	x	x	x	x	**12**	**100%**
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	-	x	x	x	x	-	x	x	x	x	x	x	**10**	**83%**

Appendix N: Question 3 (Delphi Method) – Round 2

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 3 – round 1. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the first round of question 3, you have selected from the Final Result of Question 2 only the phases, activities and tasks that you considered to be useful to estimate the budget of support events. You have also attributed resource drivers to each task.

At this moment (round 2), I would like to ask you to analyze the summary of all experts' answers (Annex 5). Please, add other suggestions to the list, if you have. If you consider that any activity or task cited should not be considered, please, explain why. If you consider that the list is completed, please, let me know.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 5: Question 3 (Round 1) - Summary of all experts' answers

Activities	Tasks	Resource Drivers	Total of experts who have cited it in round 1	% of experts who have cited it in round 1
Phase 01 - Mobilization (preparation /concentration means)				
1. Perform precursory visit	1.2 Visit the place where the deployment will be performed	Per diem	**12**	**100%**
		Ticket (round trip)	**8**	**67%**
2. Provide manpower (Planners and Operators of CUI)	2.3 Receive Planners and Operators of CUI	Per diem during preparation of material	**9**	**75%**
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	**12**	**100%**
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	**12**	**100%**
7. Provide surface transportation	7.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	**12**	**100%**
9. Clean and prepare the terrain	9.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	**4**	**33%**
10. Assembly the camp	10.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	**4**	**33%**
Phase 02 - Operation (logistical support through time)				
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	**12**	**100%**
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	**8**	**67%**
4. Provide water supply	4.1 Provide water for consumption	Water for consumption	12	**100%**

8. Provide surface transportation	8.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	**10**	**83%**
13. Provide resupply	13.2 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	**12**	**100%**
14. Provide financial support	14.1 Payment of remuneration	Per diem to go to the place of mission	**8**	**67%**
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	**12**	**100%**
Phase 03 - Demobilization (recovery of personnel and materials)				
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	**12**	**100%**
4. Provide surface transportation	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	**12**	**100%**
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	**10**	**83%**

Appendix O: Final Result of Question 3

List of phases, activities, tasks and related resource drives that are useful to estimate the budget of support events

Activities	Tasks	Resource Drivers
Phase 01 - Mobilization (preparation /concentration means)		
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem Ticket (round trip)
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material
3. Provide material and equipment	3.1 Buy material and equipment	Purchase
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled
Phase 02 - Operation (logistical support through time)		
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working
3. Provide water supply	3.1 Provide water for consumption	Water for consumption
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission

		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)
Phase 03 - Demobilization (recovery of personnel and materials)		
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material

Appendix P: Question 4 (Delphi Method) – Round 1

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 1, 2 and 3. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the first round of question 4, I would like to ask you to present your opinion about the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip), based on the Final Result of Question 3. The values of the consumption rates of activities and resource drives will be used to estimate the budget necessary to perform a support event.

Please, return it electronically to paulaferreira.ohio@gmail.com no later than 25 Dec 2012. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

Appendix Q: Answers Question 4 (Delphi Method) – Round 1

Round 1																
Demand and Consumption Rate of Activities				Officers						Sergeants						Mean	Std Dev
				Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12		
Demand for support events (per year)				10	6	6	5	6	9	5	4	6	10	6	8	7	1.92
Consumption rate of all activities				1	1	1	1	1	1	1	1	1	1	1	1	1	0.00
Activities	Tasks	Resource Drivers	Specification of Resource Drivers	Officers						Sergeants						Mean	Std Dev
				Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12		
Phase 01 - Mobilization (preparation /concentration means)																	
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	4	3	3	3	3	4	3	3	3	3	3	4	3	0.43
			Number of days	3	3	3	3	3	2	3	3	3	2	3	2	3	0.43
		Ticket (round trip)	Number of military	4	3	3	3	3	4	3	3	3	3	3	4	3	0.43
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
			Number of days	3	5	5	5	5	7	5	5	5	7	5	7	5	1.11
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1	1	1	1	1	1	1	1	1	1	1	1	1	0.00

4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1	1	1	1	1	1	1	1	1	1	1	1	1	0.00
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	6	12	6	10	12	6	12	10	12	6	12	6	9	2.76
			Km traveled (round trip)	2000	3000	6000	4000	6000	2000	5000	7000	6000	5000	6000	3000	4583	1656.22
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	2	1	1	2	1	2	1	1	1	2	1	2	1	0.49
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	4	2	2	3	2	2	2	2	2	2	2	2	2	0.60
Phase 02 - Operation (logistical support through time)																		
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21

2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	150	120	120	140	120	90	120	120	120	130	120	80	119	18.01
3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2	2	2	2	2	2	2	2	2	2	2	2	2	0.00
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	50	70	60	70	60	80	60	60	50	70	50	90	64	11.87
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	4	2	2	3	2	2	2	2	2	2	2	2	2	0.60
			Km traveled (round trip)	1000	4000	1000	2000	4000	1000	1000	2000	4000	5000	4000	2000	2583	1440.97
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2	1	2	1	1	2	1	2	1	2	1	2	2	0.50
			Number of days	1	2	2	2	2	1	2	2	2	1	2	1	2	0.47
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	230	230	230	230	230	230	230	230	230	230	230	230	0.00

Phase 03 - Demobilization (recovery of personnel and materials)																	
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	4	2	2	3	2	2	2	2	2	2	2	2	2	0.60
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	6	12	6	10	12	6	12	10	12	6	12	6	9	2.76
			Km traveled (round trip)	2000	3000	6000	4000	6000	2000	5000	7000	6000	5000	6000	3000	4583	1656.22
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	3	5	5	5	5	7	5	5	5	7	5	7	5	1.11

Appendix R: Question 4 (Delphi Method) – Round 2

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 4 – round 1. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the first round of question 4, you have presented your opinion about the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip), based on the Final Result of Question 3.

At this moment (round 2), I would like to ask you to analyze the summary of all experts' answers (Annex 6) and present your opinion one more time. You can keep or change your previous answer.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 6: Question 4 (Round 1) - Summary of all experts' answers

Round 1					
Demand and Consumption Rate of Activities				**Mean**	**Std Dev**
Demand for support events (per year)				7	1.92
Consumption rate of all activities				1	0.00
Activities	**Tasks**	**Resource Drivers**	**Specification of Resource Drivers**	**Mean**	**Std Dev**
Phase 01 - Mobilization (preparation /concentration means)					
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	3	0.43
			Number of days	3	0.43
		Ticket (round trip)	Number of military	3	0.43
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	6	1.44
			Number of days	5	1.11
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1	0.00
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1	0.00
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	9	2.76
			Km traveled (round trip)	4583	1656.22
			Consumption of fuel (Km/L)	6	1.44
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	1.21
			Number of days	1	0.49
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20	1.21
			Number of days	2	0.60

Phase 02 - Operation (logistical support through time)					
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20	1.21
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	119	18.01
3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2	0.00
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	64	11.87
			Consumption of fuel (Km/L)	6	1.44
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	0.60
			Km traveled (round trip)	2583	1440.97
			Consumption of fuel (Km/L)	6	1.44
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2	0.50
			Number of days	2	0.47
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	0.00
Phase 03 - Demobilization (recovery of personnel and materials)					
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20	1.21
			Number of days	2	0.60

2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	9	2.76
			Km traveled (round trip)	4583	1656.22
			Consumption of fuel (Km/L)	6	1.44
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	20	1.21
			Number of days	5	1.11

Appendix S: Answers Question 4 (Delphi Method) – Round 2

Round 2																
Demand and Consumption Rate of Activities				Officers						Sergeants						Mean	Std Dev
				Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12		
Demand for support events (per year)				8	6	6	5	6	8	5	5	6	8	6	8	6	1.19
Consumption rate of all activities				1	1	1	1	1	1	1	1	1	1	1	1	1	0.00
Activities	**Tasks**	**Resource Drivers**	**Specification of Resource Drivers**	Officers						Sergeants						Mean	Std Dev
				Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert 11	Expert 12		
Phase 01 - Mobilization (preparation /concentration means)																	
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	4	3	3	3	3	4	3	3	3	3	3	4	3	0.43
			Number of days	3	3	3	3	3	2	3	3	3	2	3	2	3	0.43
		Ticket (round trip)	Number of military	4	3	3	3	3	4	3	3	3	3	3	4	3	0.43
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	7	6	6	5	6	7	6	5	6	7	5	6	6	0.71
			Number of days	3	5	5	5	5	7	5	5	5	7	5	7	5	1.11
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1	1	1	1	1	1	1	1	1	1	1	1	1	0.00

4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1	1	1	1	1	1	1	1	1	1	1	1	1	0.00
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	6	10	6	10	10	6	10	10	10	6	10	6	8	1.97
			Km traveled (round trip)	3000	3500	4500	4000	4500	3000	4500	4500	4500	4500	4500	3000	4000	645.50
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	2	1	1	2	1	2	1	1	1	2	1	2	1	0.49
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	4	2	2	3	2	2	2	2	2	2	2	2	2	0.60
Phase 02 - Operation (logistical support through time)																		
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21

2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	130	120	120	130	120	110	120	120	120	130	120	100	120	8.16
3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2	2	2	2	2	2	2	2	2	2	2	2	2	0.00
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	50	70	60	65	60	70	60	60	50	65	50	65	60	6.91
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	2	2	3	2	2	2	2	2	2	2	2	2	0.28
			Km traveled (round trip)	1000	3000	1500	2000	3000	1000	1000	2000	2500	2500	2500	2000	2000	707.11
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2	1	2	1	1	2	1	2	1	2	1	2	2	0.50
			Number of days	1	2	2	2	2	1	2	2	2	1	2	1	2	0.47
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	230	230	230	230	230	230	230	230	230	230	230	230	0.00

Phase 03 - Demobilization (recovery of personnel and materials)																	
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	4	2	2	3	2	2	2	2	2	2	2	2	2	0.60
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	6	10	6	10	10	6	10	10	10	6	10	6	8	1.97
			Km traveled (round trip)	3000	3500	4500	4000	4500	3000	4500	4500	4500	4500	4500	3000	4000	645.50
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	3	5	5	5	5	7	5	5	5	7	5	7	5	1.11

Appendix T: Question 4 (Delphi Method) – Round 3

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 4 – rounds 1 and 2. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the second round of question 4, you have analyzed your opinion about the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip), based on the answers obtained in question 4 – round 1.

At this moment (round 3), I would like to ask you to analyze the new summary of all experts' answers (Annex 7) and present your opinion one more time. You can keep or change your previous answer.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 7: Question 4 (Rounds 1 and 2) - Summary of all experts' answers

				Round 1		Round 2	
Demand and Consumption Rate of Activities				**Mean**	**Std Dev**	**Mean**	**Std Dev**
Demand for support events (per year)				7	1.92	6	1.19
Consumption rate of all activities				1	0.00	1	0.00
Activities	**Tasks**	**Resource Drivers**	**Specification of Resource Drivers**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Phase 01 - Mobilization (preparation /concentration means)							
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	3	0.43	3	0.43
			Number of days	3	0.43	3	0.43
		Ticket (round trip)	Number of military	3	0.43	3	0.43
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	6	1.44	6	0.71
			Number of days	5	1.11	5	1.11
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1	0.00	1	0.00
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1	0.00	1	0.00
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	9	2.76	8	1.97
			Km traveled (round trip)	4583	1656.22	4000	645.50
			Consumption of fuel (Km/L)	6	1.44	6	1.44
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	1.21	20	1.21
			Number of days	1	0.49	1	0.49

7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20	1.21	20	1.21
			Number of days	2	0.60	2	0.60
Phase 02 - Operation (logistical support through time)							
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20	1.21	20	1.21
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	119	18.01	120	8.16
3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2	0.00	2	0.00
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	64	11.87	60	6.91
			Consumption of fuel (Km/L)	6	1.44	6	1.44
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	0.60	2	0.28
			Km traveled (round trip)	2583	1440.97	2000	707.11
			Consumption of fuel (Km/L)	6	1.44	6	1.44
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2	0.50	2	0.50
			Number of days	2	0.47	2	0.47
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	0.00	230	0.00

Phase 03 - Demobilization (recovery of personnel and materials)							
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20	1.21	20	1.21
			Number of days	2	0.60	2	0.60
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	9	2.76	8	1.97
			Km traveled (round trip)	4583	1656.22	4000	645.50
			Consumption of fuel (Km/L)	6	1.44	6	1.44
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	20	1.21	20	1.21
			Number of days	5	1.11	5	1.11

Appendix U: Answers Question 4 (Delphi Method) – Round 3

Round 3																
Demand and Consumption Rate of Activities				**Officers**						**Sergeants**						**Mean**	**Std Dev**
				Expert 1	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Expert 6**	**Expert 7**	**Expert 8**	**Expert 9**	**Expert 10**	**Expert 11**	**Expert 12**		
Demand for support events (per year)				7	6	6	5	6	7	5	5	6	7	6	7	6	0.76
Consumption rate of all activities				1	1	1	1	1	1	1	1	1	1	1	1	1	0.00
Activities	**Tasks**	**Resource Drivers**	**Specification of Resource Drivers**	**Officers**						**Sergeants**						**Mean**	**Std Dev**
				Expert 1	**Expert 2**	**Expert 3**	**Expert 4**	**Expert 5**	**Expert 6**	**Expert 7**	**Expert 8**	**Expert 9**	**Expert 10**	**Expert 11**	**Expert 12**		
Phase 01 - Mobilization (preparation /concentration means)																	
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	4	3	3	3	3	4	3	3	3	3	3	4	3	0.43
			Number of days	3	3	3	3	3	2	3	3	3	2	3	2	3	0.43
		Ticket (round trip)	Number of military	4	3	3	3	3	4	3	3	3	3	3	4	3	0.43
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	6	6	6	5	6	6	6	5	6	7	5	6	6	0.55
			Number of days	3	5	5	5	5	7	5	5	5	7	5	7	5	1.11
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1	1	1	1	1	1	1	1	1	1	1	1	1	0.00
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1	1	1	1	1	1	1	1	1	1	1	1	1	0.00

5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	6	9	6	10	9	6	10	10	9	6	9	6	8	1.73
			Km traveled (round trip)	3000	3500	4000	4000	4500	3000	4500	4000	4500	4500	4500	4000	4000	540.06
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	2	1	1	2	1	2	1	1	1	2	1	2	1	0.49
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	4	2	2	3	2	2	2	2	2	2	2	2	2	0.60
Phase 02 - Operation (logistical support through time)																	
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21

2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	120	120	120	130	120	110	120	120	120	130	120	110	120	5.77
3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2	2	2	2	2	2	2	2	2	2	2	2	2	0.00
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	50	65	60	65	60	65	60	60	50	60	60	65	60	5.00
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	2	2	3	2	2	2	2	2	2	2	2	2	0.28
			Km traveled (round trip)	1500	2500	1500	2000	2500	1500	1500	2000	2000	2500	2500	2000	2000	408.25
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2	1	2	1	1	2	1	2	1	2	1	2	2	0.50
			Number of days	1	2	2	2	2	1	2	2	2	1	2	1	2	0.47
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	230	230	230	230	230	230	230	230	230	230	230	230	0.00

Phase 03 - Demobilization (recovery of personnel and materials)																	
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	4	2	2	3	2	2	2	2	2	2	2	2	2	0.60
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	6	9	6	10	9	6	10	10	9	6	9	6	8	1.73
			Km traveled (round trip)	3000	3500	4000	4000	4500	3000	4500	4000	4500	4500	4500	4000	4000	540.06
			Consumption of fuel (Km/L)	8	6	6	5	6	10	6	5	6	8	5	6	6	1.44
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	22	20	20	20	21	18	20	21	20	18	20	22	20	1.21
			Number of days	3	5	5	5	5	7	5	5	5	7	5	7	5	1.11

Appendix V: Question 4 (Delphi Method) – Round 4

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciate your time and responses in question 4 – rounds 1, 2 and 3. Your knowledge and expertise are fundamental to the continuity of my study.

The objective of this research is to provide a more accurate way to calculate:

1.The total costs of each support performed by the CUI, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

At the third round of question 4, you have analyzed your opinion about the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip), based on the answers obtained in question 4 – round 1 and 2.

At this moment (round 4), I would like to ask you to analyze the new summary of all experts' answers (Annex 8) and present your opinion one more time. You can keep or change your previous answer.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 8: Question 4 (Rounds 1, 2 and 3) - Summary of all experts' answers

				Round 1		Round 2		Round 3	
Demand and Consumption Rate of Activities				**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Demand for support events (per year)				7	1.92	6	1.19	6	0.76
Consumption rate of all activities				1	0.00	1	0.00	1	0.00
Activities	**Tasks**	**Resource Drivers**	**Specification of Resource Drivers**	**Mean**	**Std Dev**	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Phase 01 - Mobilization (preparation /concentration means)									
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	3	0.43	3	0.43	3	0.43
			Number of days	3	0.43	3	0.43	3	0.43
		Ticket (round trip)	Number of military	3	0.43	3	0.43	3	0.43
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	6	1.44	6	0.71	6	0.55
			Number of days	5	1.11	5	1.11	5	1.11
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1	0.00	1	0.00	1	0.00
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1	0.00	1	0.00	1	0.00

5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	9	2.76	8	1.97	8	1.73
			Km traveled (round trip)	4583	1656.22	4000	645.50	4000	540.06
			Consumption of fuel (Km/L)	6	1.44	6	1.44	6	1.44
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	1.21	20	1.21	20	1.21
			Number of days	1	0.49	1	0.49	1	0.49
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20	1.21	20	1.21	20	1.21
			Number of days	2	0.60	2	0.60	2	0.60
Phase 02 - Operation (logistical support through time)									
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20	1.21	20	1.21	20	1.21

2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	119	18.01	120	8.16	120	5.77
3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2	0.00	2	0.00	2	0.00
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	64	11.87	60	6.91	60	5.00
			Consumption of fuel (Km/L)	6	1.44	6	1.44	6	1.44
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	0.60	2	0.28	2	0.28
			Km traveled (round trip)	2583	1440.97	2000	707.11	2000	408.25
			Consumption of fuel (Km/L)	6	1.44	6	1.44	6	1.44
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2	0.50	2	0.50	2	0.50
			Number of days	2	0.47	2	0.47	2	0.47
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	0.00	230	0.00	230	0.00

Phase 03 - Demobilization (recovery of personnel and materials)									
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20	1.21	20	1.21	20	1.21
			Number of days	2	0.60	2	0.60	2	0.60
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	9	2.76	8	1.97	8	1.73
			Km traveled (round trip)	4583	1656.22	4000	645.50	8000	540.06
			Consumption of fuel (Km/L)	6	1.44	6	1.44	6	1.44
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	20	1.21	20	1.21	20	1.21
			Number of days	5	1.11	5	1.11	5	1.11

Appendix W: Final Result of Question 4

List of annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of the troops during a standard deployment

Annual Demand				**Annual demand for support events**
Demand for support events (per year)				6
Consumption rate				**Consumption rates of activities**
Consumption rate of all activities				1
Activities	**Tasks**	**Resource Drivers**	**Specification of Resource Drivers**	**Consumption Rates of Resource Drivers (per support event)**
Phase 01 - Mobilization (preparation /concentration means)				
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	3
			Number of days	3
		Ticket (round trip)	Number of military	3
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	6
			Number of days	5
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8
			Km traveled (round trip)	4000
			Consumption of fuel (Km/L)	6
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20
			Number of days	1
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20
			Number of days	2

Phase 02 - Operation (logistical support through time)				
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	120
3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	60
			Consumption of fuel (Km/L)	6
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2
			Km traveled (round trip)	2000
			Consumption of fuel (Km/L)	6
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2
			Number of days	2
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230
Phase 03 - Demobilization (recovery of personnel and materials)				
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20
			Number of days	2
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8
			Km traveled (round trip)	4000
			Consumption of fuel (Km/L)	6
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	20
			Number of days	5

Appendix X: Final Report

Dear Planners/Operators of Cellular Unit of Intendancy (CUI),

Thank you for participating in this research study. I appreciated your time and responses. Your knowledge and expertise were fundamental to the continuity of my study.

This research utilized the Delphi Method to develop the following lists:

1.Phases, activities and tasks necessary to performed a complete support event for the basic needs of the troops during a deployment;

2.Activities, tasks and their related cost drivers that imply on additional cost beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support);

3.Phases, activities, tasks and related resources drives useful to estimate the budget in order to reduce the difference between the value forecasted and the actual value spent, calculated after the mission;

4. Annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of the troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip).

The result obtained with the performance of this method was used in the implementation of the Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems. These systems were used to develop models that will provide the officers with a more accurate way to calculate the following:

1.The total costs of each support performed, based only on those activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), and

2.The budget necessary to support the basic needs of the fighters from a military unit deployed to accomplish a mission, real or training.

The ABC model (a report of total costs that list all costs incurred in the performance of logistical support activities for the basic needs of troops deployed) and the ABB model (an excel spreadsheet that estimates the budget based on the consumption rates of activities and resource drivers and on their current values) will enable the officers to better plan the financial applications for the CUIs and to have more control of the existing resources. They will also be able to better define what support missions the CUIs will perform or not when the resources are short or some contingency is taken place, based on each estimate of budget.

In order to conclude this Delphi process adequately, a summary of all surveys and the results obtained will be presented. I would like to invite you to analyze if your answers were in accordance with the lists created. If you consider that the lists are completed, please, let me know.

Please, return it electronically to paulaferreira.ohio@gmail.com. If you have questions, please call me 1(937) 469-7772.

Paula Ferreira da Silva – Captain of Intendancy

ANNEX 9: Summary of the Delphi Surveys

Question 1	Open Question	The experts were asked to do a brainstorm and relate as many phases, activities and tasks as they could identify as necessary to perform a complete support event for the basic needs of troops deployed.	**Consensus was reached in** Round 2
Question 2	Multiple Choice with Showcase	The experts were asked to pick all activities and tasks that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support), from the list resulting from question 1, and attribute the correspondents cost drivers.	**Consensus was reached in** Round 3
Question 3	Multiple Choice with Showcase	The experts were asked to pick all phases, activities and tasks that they considered to be useful to estimate the budget of support events, from the list resulting from question 2, and attribute the correspondent resource drivers.	**Consensus was reached in** Round 2
Question 4	Open Question	The experts were asked to present their opinion about the annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of troops during a standard deployment (support up to 250 soldiers during 15 days with resupply, at a site close to a high-way or airstrip).	**Consensus was reached in** Round 4

ANNEX 10: Summary of the Delphi Method Final Results

Final Result of Question 1 - List of phases, activities and tasks necessary to perform a complete logistical support event for the basic needs of troops deployed, during training or actual missions

Activities	Tasks
Phase 01 - Mobilization (preparation /concentration means)	
1. Prepare support event plan	1.1 Prepare support event plan
2. Request authorization to perform the support	2.1 Request authorization to perform the support
3. Perform precursory visit	3.1 Request authorization to perform precursory visit
	3.2 Visit the place where the deployment will be performed
4. Chose the site to build the camp	4.1 Request authorization to build the camp in the site chosen
5. Provide manpower (Planners and Operators of CUI)	5.1 Request authorization to the Commanders/Call notice
	5.2 Call Planners and Operators of CUI to give basic information about the support
	5.3 Receive Planners and Operators of CUI
6. Provide material and equipment	6.1 Buy material and equipment
	6.2 Store material and equipment
	6.3 Request material or equipment from another organization
	6.4 Transport borrowed material or equipment
7. Provide food	7.1 Buy items to prepare and serve meals
	7.2 Store items
	7.3 Produce and frozen meals
	7.4 Store frozen meals
8. Provide special uniforms	8.1 Buy items
	8.2 Store items
	8.3 Distribute items
9. Provide consumable items	9.1 Buy items
	9.2 Store items
10. Load material, equipment, food, manpower	10.1 Prepare material, equipment, food for shipment
	10.2 Ship material, equipment, food at the warehouse
	10.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1
11. Provide surface transportation	11.1 Request authorization
	11.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)
12. Unload material, equipment, food, manpower	12.1 Land material, equipment, food at local of concentration 2
	12.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area

13. Clean and prepare the terrain	13.1 Prepare the terrain to assembly the camp
	13.2 Check necessity of special services
14. Assembly the camp	14.1 Assembly tents, machines, equipment
15. Provide financial support	15.1 Payment of per diem
	15.2 Payment of Ticket
	15.3 Payment of purchases
	15.4 Payment of remuneration
Phase 02 - Operation (logistical support through time)	
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower
3. Treat water	3.1 Purify water
4. Provide water supply	4.1 Provide water for consumption
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)
5. Provide bath, sanitary	5.1 Provide bathrooms
	5.2 Keep bathrooms clean
6. Provide laundry service	6.1 Wash and dry uniforms
7. Provide communication	7.1 Provide telephony and internet
8. Provide postal service	8.1 Send mail
	8.2 Receive mail
	8.3 Evaluate mail
	8.4 Delivery mail
9. Provide recreational facilities	9.1 Provide space and activities to entertainment
10. Provide consumable items	10.1 Organize items
	10.2 Sell Items
	10.3 Control the money
11. Provide surface transportation	11.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)
12. Perform maintenance of the camp (equipment, facilities)	12.1 Perform maintenance (outdoor)
13. Repair and maintain intendancy material	13.1 Perform repair and maintenance (outdoor)
14. Explore local resources	14.1 Explore resources
15. Collect the material captured from the enemy	15.1 Collect the material
	15.2 Store the material
16. Collect, group and evacuate salvage	16.1 Collect material
	16.2 Store material
	16.3 Evacuate material
17. Control excess material	17.1 Control material
18. Perform burial and control assets	18.1 Collect bodies
	18.2 Bury bodies
	18.3 Collect belongings

	18.4 Store belongings
	18.5 Evacuate bodies and belongings
19. Perform disinfection	19.1 Provide material for disinfection
	19.2 Provide new uniforms
	19.3 Dispose infected material
20. Provide resupply	20.1 Prepare material, equipment, food for shipment
	20.2 Transport material, equipment, food
21. Provide financial support	21.1 Payment of remuneration
	21.2 Payment of purchases
	21.3 Payment of contracts
Phase 03 - Demobilization (recovery of personnel and materials)	
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment
	2.2 Ship material, equipment, food at the warehouse
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1
3. Clean and prepare the terrain	3.1 Clean the terrain after mission
	3.2 Check necessity of special services
4. Provide surface transportation	4.1 Request authorization
	4.2 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI
	6.2 Report performance of Planners and Operators of CUI to respective Commanders
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)
	7.2 Store material and equipment
	7.3 Return material or equipment borrowed from another organization
	7.4 Transport borrowed material or equipment
8. Provide financial support	8.1 Payment of per diem
	8.2 Payment of tickets
	8.3 Payment of contracts

Final Result of Question 2 – List of activities, tasks and their related cost drivers that imply additional costs beyond the normal operations of the Air Base (headquarters of the Cellular Unit of Intendancy, responsible for support)

Activities	Tasks	Cost Drivers
Phase 01 - Mobilization (preparation /concentration means)		
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem
		Ticket price (round trip)
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material
		Ticket price (Air Base of origin to warehouse)
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
3. Provide material and equipment	3.1 Buy material and equipment	Total costs of purchases
	3.2 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
4. Provide food	4.1 Buy items to prepare and serve meals	Total costs of purchases
5. Provide special uniforms	5.1 Buy items	Total costs of purchases
6. Load material, equipment, food, manpower	6.1 Prepare material, equipment, food for shipment	Packing Costs
	6.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	6.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	Fuel costs (military truck)
7. Provide surface transportation	7.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
8. Unload material, equipment, food, manpower	8.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment

	8.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)
9. Clean and prepare the terrain	9.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared
	9.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)
10. Assembly the camp	10.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled
Phase 02 - Operation (logistical support through time)		
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)
5. Provide laundry service	5.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)
6. Provide communication	6.1 Provide telephony and internet	Value of contracts
7. Provide postal service	7.1 Send mail	Value of contract with postal company
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
8. Provide surface transportation	8.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)
9. Perform maintenance of the camp (equipment, facilities)	9.1 Perform maintenance (outdoor)	Total value of each contract
10. Repair and maintain intendancy material	10.1 Perform repair and maintenance (outdoor)	Total value of each contract
11. Collect, group and evacuate salvage	11.1 Evacuate material	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
12. Perform burial and control assets	12.1 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck

13. Provide resupply	13.1 Prepare material, equipment, food for shipment	Packing Costs
		Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	13.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
14. Provide financial support	14.1 Payment of remuneration	Per diem to go to the place of mission
		Ticket price (round trip)
		Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)
Phase 03 - Demobilization (recovery of personnel and materials)		
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs
	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	Fuel costs (military truck)
3. Clean and prepare the terrain	3.1 Check necessity of special services	Total costs of service (earthwork, etc)
4. Provide surface transportation	4.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment
		Fuel costs to operate ground support equipment
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	Fuel costs (military truck)
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material
		Ticket price (warehouse to Air Base of origin)
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract

	7.2 Store material and equipment	Depreciation costs of material and equipment
	7.3 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport
		Per diem for crew if military airplane
		Per diem for drivers if military truck

Final Result of Question 3 – List of phases, activities, tasks and related resource drives that need to be included in the calculation of the budget

Activities	**Tasks**	**Resource Drivers**
Phase 01 - Mobilization (preparation /concentration means)		
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem
		Ticket (round trip)
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material
3. Provide material and equipment	3.1 Buy material and equipment	Purchase
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled
Phase 02 - Operation (logistical support through time)		
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working

3. Provide water supply	3.1 Provide water for consumption	Water for consumption
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)
Phase 03 - Demobilization (recovery of personnel and materials)		
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material

Final Result of Question 4 – List of annual demand for support events and the consumption rates of activities and resource drivers required to support the basic needs of the troops during a standard deployment

Annual Demand	**Annual demand for support events**
Demand for support events (per year)	6
Consumption rate	**Consumption rates of activities**
Consumption rate of all activities	1

Activities	Tasks	Resource Drivers	Specification of Resource Drivers	Consumption Rates of Resource Drivers (per support event)
Phase 01 - Mobilization (preparation /concentration means)				
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Number of military	3
			Number of days	3
		Ticket (round trip)	Number of military	3
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Number of military	6
			Number of days	5
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Number of purchases	1
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Number of purchases	1
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8
			Km traveled (round trip)	4000
			Consumption of fuel (Km/L)	6
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20
			Number of days	1
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20
			Number of days	2
Phase 02 - Operation (logistical support through time)				
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Consume of fuel (per day)	120

3. Provide water supply	3.1 Provide water for consumption	Water for consumption	Consumption of water (Liters per person/per day)	2
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Km traveled (per day)	60
			Consumption of fuel (Km/L)	6
5. Provide resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2
			Km traveled (round trip)	2000
			Consumption of fuel (Km/L)	6
6. Provide financial support	6.1 Payment of remuneration	Per diem to go to the place of mission	Number of military	2
			Number of days	2
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230
Phase 03 - Demobilization (recovery of personnel and materials)				
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20
			Number of days	2
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8
			Km traveled (round trip)	4000
			Consumption of fuel (Km/L)	6
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Number of military	20
			Number of days	5

Appendix Y: ABC Model – Report of Total Costs

CELLULAR UNIT OF INTENDANCY														
ACTIVITY BASED COSTING – REPORT OF TOTAL COSTS														
Activities	**Tasks**	**Cost Drivers**	**Cost Drivers Information**										**Partial Costs per Cost Drive**	**Partial Costs per Activity**
Phase 01 - Mobilization (preparation /concentration means)														
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of team members											
			Number of travel days											
		Ticket price (round trip)	Value of ticket											
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)											
			Km traveled if truck (round trip)											
			Consumption of fuel (Km/L)											
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant-Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of crew members											
			Number of travel days											

		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant-Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of drivers										
			Number of travel days										
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of team members										
			Number of days preparing material										
		Ticket price (Air Base of origin to warehouse)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of team members										
			Value of tickets										
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)										
			Km traveled if truck (round trip)										
			Consumption of fuel (Km/L)										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of crew members										
			Number of travel days										

		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of drivers											
			Number of travel days											
3. Provide material and equipment	3.1 Buy material and equipment	Total costs of purchases	Value of purchases											
	3.2 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)											
			Km traveled if truck (round trip)											
			Consumption of fuel (Km/L)											
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of crew members											
			Number of travel days											
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of drivers											
			Number of travel days											
4. Provide food	4.1 Buy items to prepare and serve meals	Total costs of purchases	Value of purchases											
5. Provide special uniforms	5.1 Buy items	Total costs of purchases	Value of purchases											

6. Load material, equipment, food, manpower	6.1 Prepare material, equipment, food for shipment	Packing Costs	Cost of material to pack											
	6.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment	Cost of renting											
		Fuel costs to operate ground support equipment	Consumption of fuel (L)											
	6.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	Fuel costs (military truck)	Km traveled if truck (round trip)											
			Consumption of fuel (Km/L)											
7. Provide surface transportation	7.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)											
			Km traveled if truck (round trip)											
			Consumption of fuel (Km/L)											
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of crew members											
			Number of travel days											

		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of drivers											
			Number of travel days											
8. Unload material, equipment, food, manpower	8.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	Cost of renting											
		Fuel costs to operate ground support equipment	Consumption of fuel (L)											
	8.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)	Km traveled (round trip)											
			Consumption of fuel (Km/L)											
9. Clean and prepare the terrain	9.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of team members											
			Number of days to prepare the terrain											
	9.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)	Cost of special services											

10. Assembly the camp	10.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of team members											
			Number of days to assemble the camp											
TOTAL COSTS PHASE 01														
Phase 02 - Operation (logistical support through time)														
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% for basic remuneration per day for Planners and Operators of CUI)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of team members											
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)	Consumption of fuel per day											
			Electricity costs											
			Maintenance costs											
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)	Consumption of fuel per day											
			Electricity costs											
			Maintenance costs											
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)	Liters of water consumed per person per day											

			Cost of water per liter			
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)	Liters of water consumed per day			
			Cost of water per liter			
5. Provide laundry service	5.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)	Consumption of fuel per day of service laundry			
			Electricity costs			
			Maintenance costs			
			Consumption of water per wash (L)			
			Number of washes per day			
			Number of days of laundry service			
			Cost of water per liter			
6. Provide communication	6.1 Provide telephony and internet	Value of contract	Cost of contract			
7. Provide postal service	7.1 Send mail	Value of contract with postal company	Cost of contract			

		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)										
			Km traveled if truck (round trip)										
			Consumption of fuel (Km/L)										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of crew members										
			Number of travel days										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of drivers										
			Number of travel days										
8. Provide surface transportation	8.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)	Km traveled per day										
			Consumption of fuel (Km/L)										
9. Perform maintenance of the camp (equipment, facilities)	9.1 Perform maintenance (outdoor)	Total value of each contract	Total costs of contracts										

10. Repair and maintain intendancy material	10.1 Perform repair and maintenance (outdoor)	Total value of each contract	Total costs of contracts													
11. Collect, group and evacuate salvage	11.1 Evacuate material	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)													
			Km traveled if truck (round trip)													
			Consumption of fuel (Km/L)													
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman				
			Number of crew members													
			Number of travel days													
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman				
			Number of drivers													
			Number of travel days													
12. Perform burial and control assets	12.1 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)													-
			Km traveled if truck (round trip)													
			Consumption of fuel (Km/L)													
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman				
			Number of crew members													

			Number of travel days										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of drivers										
			Number of travel days										
13. Provide resupply	13.1 Prepare material, equipment, food for shipment	Packing Costs	Cost of material to pack										
		Cost of renting ground support equipment	Cost of renting										
		Fuel costs to operate ground support equipment	Consumption of fuel (L)										
	13.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)										
			Km traveled if truck (round trip)										
			Consumption of fuel (Km/L)										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of crew members										
			Number of travel days										

		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of drivers											
			Number of travel days											
14. Provide financial support	14.1 Payment of remuneration	Per diem to go to the place of mission	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of team members											
			Number of travel days											
		Ticket price (round trip)	Value of ticket											
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)											
			Km traveled if truck (round trip)											
			Consumption of fuel (Km/L)											
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of crew members											
			Number of travel days											
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of drivers											
			Number of travel days											

		Additional of remuneration (2% for basic remuneration per day for the military of all air units in camp)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of military in camp											
TOTAL COSTS PHASE 02														
Phase 03 - Demobilization (recovery of personnel and materials)														
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		
			Number of team members											
			Number of days to disassemble the camp											
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs	Cost of material to pack											
	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment	Cost of renting											
		Fuel costs to operate ground support equipment	Consumption of fuel (L)											
	2.3 Transport material, equipment, food,	Fuel costs (military truck)	Km traveled (round trip)											

	manpower from the camp area to the local of concentration 1		Consumption of fuel (Km/L)													
3. Clean and prepare the terrain	3.1 Check necessity of special services	Total costs of service (earthwork, etc)	Cost of special services													
4. Provide surface transportation	4.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)													
			Km traveled if truck (round trip)													
			Consumption of fuel (Km/L)													
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman				
			Number of crew members													
			Number of travel days													
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman				
			Number of drivers													
			Number of travel days													
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	Cost of renting													

		Fuel costs to operate ground support equipment	Consumption of fuel (L)													
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	Fuel costs (military truck)	Km traveled (round trip)													
			Consumption of fuel (Km/L)													
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman				
			Number of team members													
			Number of days to maintain the material													
		Ticket price (warehouse to Air Base of origin)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman				
			Number of team members													
			Value of ticket													
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract	Total costs of contracts													
	7.2 Store material and equipment	Depreciation costs of material and equipment	% of depreciation	0.50%			1.50%			10%						
			Total costs of material and equipment													

	7.3 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)										
			Km traveled if truck (round trip)										
			Consumption of fuel (Km/L)										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of crew members										
			Number of travel days										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	
			Number of drivers										
			Number of travel days										
TOTAL COSTS PHASE 03													
TOTAL COSTS OF SUPPORT EVENT													

Appendix Z: Equations for ABC Model

Activities	Tasks	Cost Drivers	Equations
Phase 01 - Mobilization (preparation /concentration means)			
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	(Number of team members (per rank) x Value of Per diem (per rank) x Number of days of visit) + (Number of team members (total) x Additional for loading)
		Ticket price (round trip)	Number of team members x Value of each ticket
		Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	(Number of team members (per rank) x Value of Per diem (per rank) x Number of days preparing material) + (Number of team members (total) x Additional for loading)
		Ticket price (Air Base of origin to warehouse)	Number of team members x Value of each ticket
		Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
3. Provide material and equipment	3.1 Buy material and equipment	Total costs of purchases	Sum of all values of purchases
	3.2 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)

		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
4. Provide food	4.1 Buy items to prepare and serve meals	Total costs of purchases	Sum of all values of purchases
5. Provide special uniforms	5.1 Buy items	Total costs of purchases	Sum of all values of purchases
6. Load material, equipment, food, manpower	6.1 Prepare material, equipment, food for shipment	Packing Costs	Sum of all costs of material to pack
	6.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment	Support equipment rent
		Fuel costs to operate ground support equipment	Consumption of fuel x Cost of fuel (per Liter)
	6.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	Fuel costs (military truck)	Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
7. Provide surface transportation	7.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
8. Unload material, equipment, food, manpower	8.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	Sum of all ground support equipment rents
		Fuel costs to operate ground support equipment	Consumption of fuel x Cost of fuel (per Liter)
	8.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)	Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)

9. Clean and prepare the terrain	9.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	(Number of team members (per rank) x Value of Per diem (per rank) x Number of days to prepare the terrain) + (Number of team members (total) x Additional for loading)
	9.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)	Sum of all special services costs
10. Assembly the camp	10.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	(Number of team members (per rank) x Value of Per diem (per rank) x Number of days to assemble the camp) + (Number of team members (total) x Additional for loading)
Phase 02 - Operation (logistical support through time)			
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% for basic remuneration per day for Planners and Operators of CUI)	(Number of team members (per rank) x 2% for basic remuneration) x Number of days in camp
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)	Consumption of fuel x Cost of fuel (per Liter) x number of days in camp
			Sum of all electricity costs
			Sum of all maintenance costs
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)	Consumption of fuel x Cost of fuel (per Liter) x number of days in camp
			Sum of all electricity costs
			Sum of all maintenance costs
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)	Liters of water consumed per person per day x Number of days in camp x Cost of water per liter x number of people in camp
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)	Liters of water consumed per day x Number of days in camp x Cost of water per liter
5. Provide laundry service	5.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)	Consumption of fuel per day of service laundry x Cost of fuel (per Liter) x number of days of laundry service
			Sum of all electricity costs
			Sum of all maintenance costs
			Consumption of water per wash x Number of washes per day x Number of days of laundry service x Cost of water per liter
6. Provide communication	6.1 Provide telephony and internet	Value of contracts	Sum of all contracts

7. Provide postal service	7.1 Send mail	Value of contract with postal company	Cost of contract
		Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
8. Provide surface transportation	8.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)	Km traveled per day x Consumption of fuel (Km/L) x Cost of fuel (per Liter) x number of days in camp
9. Perform maintenance of the camp (equipment, facilities)	9.1 Perform maintenance (outdoor)	Total value of each contract	Sum of all contracts
10. Repair and maintain intendancy material	10.1 Perform repair and maintenance (outdoor)	Total value of each contract	Sum of all contracts
11. Collect, group and evacuate salvage	11.1 Evacuate material	Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
12. Perform burial and control assets	12.1 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)

13. Provide resupply	13.1 Prepare material, equipment, food for shipment	Packing Costs	Sum of all costs of material to pack
		Cost of renting ground support equipment	Support equipment rent
		Fuel costs to operate ground support equipment	Consumption of fuel x Cost of fuel (per Liter)
	13.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
14. Provide financial support	14.1 Payment of remuneration	Per diem to go to the place of mission	(Number of team members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of team members (total) x Additional for loading)
		Ticket price (round trip)	Number of team members x Value of each ticket
		Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
		Additional of remuneration (2% for basic remuneration per day for the military of all air units in camp)	(Number of military in camp (per rank) x 2% for basic remuneration) x Number of days in camp
Phase 03 - Demobilization (recovery of personnel and materials)			
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	(Number of team members (per rank) x Value of Per diem (per rank) x Number of days to disassemble the camp) + (Number of team members (total) x Additional for loading)
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs	Sum of all costs of material to pack

	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment	Support equipment rent
		Fuel costs to operate ground support equipment	Consumption of fuel x Cost of fuel (per Liter)
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	Fuel costs (military truck)	Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
3. Clean and prepare the terrain	3.1 Check necessity of special services	Total costs of service (earthwork, etc)	Sum of all services costs
4. Provide surface transportation	4.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	Support equipment rent
		Fuel costs to operate ground support equipment	Consumption of fuel x Cost of fuel (per Liter)
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	Fuel costs (military truck)	Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	(Number of team members (per rank) x Value of Per diem (per rank) x Number of days to maintain the material) + (Number of team members (total) x Additional for loading)
		Ticket price (warehouse to Air Base of origin)	Number of team members x Value of each ticket
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract	Sum of all contracts
	7.2 Store material and equipment	Depreciation costs of material and equipment	(Cost of material and equipment x 0.5% of depreciation) + (Cost of material and equipment x 1.5% of depreciation) + (Cost of material and equipment x 10% of depreciation)

	7.3 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	If military airplane: Value of flight hours x flight hours
			If military truck: Km traveled x Consumption of fuel (Km/L) x Cost of fuel (per Liter)
		Per diem for crew if military airplane	(Number of crew members (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of crew members (total) x Additional for loading)
		Per diem for drivers if military truck	(Number of drivers (per rank) x Value of Per diem (per rank) x Number of travel days) + (Number of drivers (total) x Additional for loading)

Appendix AA: Total Demand for Resource Drivers Consumed

Activities	Tasks	Total demand for activities consumed (per year)	Resource Drivers	Specification of Resource Drivers	Consumption Rates of Resource Drivers (per support event)	Total demand for resource drivers consumed (per year)
Phase 01 - Mobilization (preparation /concentration means)						
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	6	Per diem	Number of military	3	18
				Number of days	3	18
			Ticket (round trip)	Number of military	3	18
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI		Per diem during preparation of material	Number of military	6	36
				Number of days	5	30
3. Provide material and equipment	3.1 Buy material and equipment		Purchase	Number of purchases	1	6
4. Provide food	4.1 Buy items to prepare and serve meals		Purchase	Number of purchases	1	6
5. Provide surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48
				Km traveled (round trip)	4000	24000
				Consumption of fuel (Km/L)	6	36
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp		Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	120
				Number of days	1	6

7. Assembly the camp	7.1 Assembly tents, machines, equipment		Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20	120
				Number of days	2	12
Phase 02 - Operation (logistical support through time)						
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	6	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20	120
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower		Fuel to keep the power generator working	Consume of fuel (per day)	120	720
3. Provide water supply	3.1 Provide water for consumption		Water for consumption	Consumption of water (Liters per person/per day)	2	12
4. Provide surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)		Fuel (military truck or bus)	Km traveled (per day)	60	360
				Consumption of fuel (Km/L)	6	36
5. Provide resupply	5.1 Transport material, equipment, food		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	12
				Km traveled (round trip)	2000	12000
				Consumption of fuel (Km/L)	6	36
6. Provide financial support	6.1 Payment of remuneration		Per diem to go to the place of mission	Number of military	2	12
				Number of days	2	12

			Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	1380
Phase 03 - Demobilization (recovery of personnel and materials)						
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	6	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20	120
				Number of days	2	12
2. Provide surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48
				Km traveled (round trip)	4000	24000
				Consumption of fuel (Km/L)	6	36
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI		Per diem during maintenance of material	Number of military	20	120
				Number of days	5	30

Appendix BB: ABB Model – Estimate of the Budget

Screen 1 – Phase 01

CELLULAR UNIT OF INTENDANCY				
ACTIVITY BASED BUDGET MODEL				
Phase 01 - Mobilization (preparation /concentration averages)				
Activities	**Tasks**	**Resource Drivers**	**Specification of Expenses**	**Average Cost of 1 Unit of Resource Drive**
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Weighted average value of Per Diem	
		Ticket (round trip)	Average Cost of Tickets	
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Average Cost of Per Diem	
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Total Cost of Purchases	
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Total Cost of Purchases	
5. Surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	If airplane: Average Cost of Flight Hours	
			If truck: Average Cost of Diesel (R$/L)	
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Weighted average value of Per Diem	
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Weighted average value of Per Diem	
			ESTIMATE OF COST PHASE 01	
CLEAN	**PHASE 02**	**PHASE 03**	**SUMMARY**	

Screen 2 – Phase 02

CELLULAR UNIT OF INTENDANCY				
ACTIVITY BASED BUDGET MODEL				
Phase 02 - Operation (logistical support through time)				
Activities	**Tasks**	**Resource Drivers**	**Specification of Expenses**	**Average Cost of 1 Unit of Resource Drive**
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Weighted average value of remuneration	
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Average Cost of Diesel (R$/L)	
3. Water supply	3.1 Provide water for consumption	Water for consumption	Average Cost of Water for consumption (R$/L)	
4. Surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Average Cost of Diesel (R$/L)	
5. Resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	If airplane: Average Cost of Flight Hours	
			If truck: Average Cost of Diesel (R$/L)	
6. Finance	6.1 Payment of remuneration	Per diem to go to the place of mission	Weighted average value of Per Diem	
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Weighted average value of remuneration	
			ESTIMATE OF COST PHASE 02	
CLEAN	**PHASE 01**	**PHASE 03**	**SUMMARY**	

Screen 3 – Phase 03

CELLULAR UNIT OF INTENDANCY				
ACTIVITY BASED BUDGET MODEL				
Phase 03 - Demobilization (recovery of personnel and materials)				
Activities	**Tasks**	**Resource Drivers**	**Specification of Expenses**	**Average Cost of 1 Unit of Resource Drive**
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Weighted average value of Per Diem	
2. Surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	If airplane: Average Cost of Flight Hours	
			If truck: Average Cost of Diesel (R$/L)	
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Weighted average value of Per Diem	
			ESTIMATE OF COST PHASE 03	
CLEAN	PHASE 01	PHASE 02	SUMMARY	

Screen 4 - Summary

CELLULAR UNIT OF INTENDANCY	
ACTIVITY BASED BUDGET MODEL	
ESTIMATE OF COST PHASE 01	
ESTIMATE OF COST PHASE 02	
ESTIMATE OF COST PHASE 03	
ESTIMATE OF TOTAL COST PER SUPPORT EVENT	
ESTIMATE OF TOTAL COST PER YEAR (6 SUPPORT EVENTS)	

CLEAN | PHASE 01 | PHASE 02 | PHASE 03

Screen 5 – Macros

Activities	Tasks	Total demand of activities consumed (per year)	Resource Drivers	Specification of Resource Drivers	Consumption Rates of Resource Drivers (per support event)	Total demand of resource drivers consumed (per year)	Average Cost of 1 Unit of Resource Drive	Partial Costs per Resource Drive	Partial Costs per Activity per Support Event	Partial Costs per Activity per Year (06 support events)
Phase 01 - Mobilization (preparation /concentration means)										
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	6	Per diem	Number of military	3	18				
				Number of days	3	18				
			Ticket (round trip)	Number of military	3	18				
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI		Per diem during preparation of material	Number of military	6	36				
				Number of days	5	30				
3. Provide material and equipment	3.1 Buy material and equipment		Purchase	Number of purchases	1	6				
4. Provide food	4.1 Buy items to prepare and serve meals		Purchase	Number of purchases	1	6				
5. Surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48				
				Km (round trip)	4000	24000				
				Consumption of fuel (Km/L)	6	36				

6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp		Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	120				
				Number of days	1	6				
7. Assembly the camp	7.1 Assembly tents, machines, equipment		Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20	120				
				Number of days	2	12				
ESTIMATE OF COST PHASE 01										
Phase 02 - Operation (logistical support through time)										
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	6	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20	120				
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower		Fuel to keep the power generator working	Consume of fuel (per day)	120	720				
3. Water supply	3.1 Provide water for consumption		Water for consumption	Consumption of water (Liters per person/per day)	2	12				

4. Surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)		Fuel (military truck or bus)	Km (per day)	60	360				
				Consumption of fuel (Km/L)	6	36				
5. Resupply	5.1 Transport material, equipment, food		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	12				
				Km (round trip)	2000	12000				
				Consumption of fuel (Km/L)	6	36				
6. Finance	6.1 Payment of remuneration		Per diem to go to the place of mission	Number of military	2	12				
				Number of days	2	12				
			Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	1380				
ESTIMATE OF COST PHASE 02										
Phase 03 - Demobilization (recovery of personnel and materials)										
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	6	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20	120				
				Number of days	2	12				

2. Surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48				
				Km (round trip)	4000	24000				
				Consumption of fuel (Km/L)	6	36				
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI		Per diem during maintenance of material	Number of military	20	120				
				Number of days	5	30				
ESTIMATE OF COST PHASE 03										
ESTIMATE OF TOTAL COSTS										

Appendix CC: ABC Model - Report of Total Costs of Operation "ACISO BH 2013"

CELLULAR UNIT OF INTENDANCY														
ACTIVITY BASED COSTING – REPORT OF TOTAL COSTS														
Activities	**Tasks**	**Cost Drivers**	**Cost Drivers Information**										**Partial Costs per Cost Drive**	**Partial Costs per Activity**
Phase 01 - Mobilization (preparation /concentration means)														
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 2,196.60	R$ 3,762.60
			Number of team members	-	-	-	-	1	1	1	-	-		
			Number of travel days	3										
		Ticket price (round trip)	Value of ticket	522									R$ 1,566.00	
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	-									-	
			Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant-Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of crew members	-	-	-	-	-	-	-	-	-		

			Number of travel days	-											
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant-Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-		
			Number of drivers	-	-	-	-	-	-	-	-	-			
			Number of travel days	-											
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 15,818.00	R$ 20,362.00	
			Number of team members	-	-	-	-	-	-	6	4	-			
			Number of days preparing material	7											
		Ticket price (Air Base of origin to warehouse)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 4,544.00		
			Number of team members	-	-	-	-	-	-	6	4	-			
			Value of tickets	-	-	-	-	-	-	124	950	-			
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	-									-		
			Km traveled if truck (round trip)	-									-		
			Consumption of fuel (Km/L)	-											
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-		
			Number of crew members	-	-	-	-	-	-	-	-	-			
			Number of travel days	-											

		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
3. Provide material and equipment	3.1 Buy material and equipment	Total costs of purchases	Value of purchases	16318									R$ 16,318.00	R$ 16,318.00
	3.2 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	-									-	
			Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of crew members	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
4. Provide food	4.1 Buy items to prepare and serve meals	Total costs of purchases	Value of purchases	33880									R$ 33,880.00	R$ 33,880.00
5. Provide special uniforms	5.1 Buy items	Total costs of purchases	Value of purchases	-									-	-

6. Load material, equipment, food, manpower	6.1 Prepare material, equipment, food for shipment	Packing Costs	Cost of material to pack	750									R$ 750.00	R$ 1,610.00
	6.2 Ship material, equipment, food at the warehouse	Cost of renting ground support equipment	Cost of renting	800									R$ 800.00	
		Fuel costs to operate ground support equipment	Consumption of fuel (L)	20									R$ 36.00	
	6.3 Transport material, equipment, food, manpower from the warehouse to the local of concentration 1	Fuel costs (military truck)	Km traveled if truck (round trip)	80									R$ 24.00	
			Consumption of fuel (Km/L)	6										
7. Provide surface transportation	7.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	6									R$ 80,682.00	R$ 82,761.20
			Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 2,079.20	
			Number of crew members	-	-	-	-	1	1	1	1			
			Number of travel days	2										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		

			Number of travel days	-											
8. Unload material, equipment, food, manpower	8.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	Cost of renting	-										R$ 6.00	R$ 6.00
		Fuel costs to operate ground support equipment	Consumption of fuel (L)	-											
	8.2 Transport material, equipment, food, manpower from the local of concentration 2 to the camp area	Fuel costs (military truck)	Km traveled (round trip)	20											
			Consumption of fuel (Km/L)	6											
9. Clean and prepare the terrain	9.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		R$ 6,732.20	R$ 7,932.20
			Number of team members	-	-	1	-	1	1	6	11	2			
			Number of days to prepare the terrain	1											
	9.2 Check necessity of special services	Total costs of special services (earthwork, fumigation, etc)	Cost of special services	1200										R$ 1,200.00	
10. Assembly the camp	10.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		R$ 11,374.40	R$ 11,374.40
			Number of team members	-	-	1	-	1	1	6	11	2			
			Number of days to assemble the camp	2											

													TOTAL COSTS PHASE 01	**R$ 178,006.40**
Phase 02 - Operation (logistical support through time)														
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% for basic remuneration per day for Planners and Operators of CUI)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 21,718.76	R$ 21,718.76
			Number of team members	-	-	1	-	1	1	6	11	2		
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Costs to keep the power generator working (Fuel or electricity costs, maintenance)	Consumption of fuel per day	120									R$ 3,024.00	R$ 3,024.00
			Electricity costs	-										
			Maintenance costs	-										
3. Treat water	3.1 Purify water	Costs to keep the machines working (Fuel or electricity costs, maintenance)	Consumption of fuel per day	20									R$ 504.00	R$ 504.00
			Electricity costs	-										
			Maintenance costs	-										
4. Provide water supply	4.1 Provide water for consumption	Cost per liter consumed (R$/L)	Liters of water consumed per person per day	2									R$ 3,388.00	R$ 4,004.00
			Cost of water per liter	0.5										
	4.2 Provide water for all activities (bathrooms, kitchen, laundry, maintenance, cleaning)	Cost per liter consumed (R$/L)	Liters of water consumed per day	220									R$ 616.00	
			Cost of water per liter	0.2										

5. Provide laundry service	5.1 Wash and dry uniforms	Costs to keep the machines working (Fuel or electricity costs, water, maintenance)	Consumption of fuel per day of service laundry	20	R$ 252.00	R$ 1,260.00
			Electricity costs	-		
			Maintenance costs	-		
			Consumption of water per wash (L)	120	R$ 1,008.00	
			Number of washes per day	6		
			Number of days of laundry service	7		
			Cost of water per liter	0.2		
6. Provide communication	6.1 Provide telephony and internet	Value of contract	Cost of contract	300	R$ 300.00	R$ 300.00
7. Provide postal service	7.1 Send mail	Value of contract with postal company	Cost of contract	-	-	-
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	-	-	
			Km traveled if truck (round trip)	-	-	
			Consumption of fuel (Km/L)	-		

		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of crew members	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
8. Provide surface transportation	8.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel Costs (military truck or bus)	Km traveled per day	80									R$ 336.00	R$ 336.00
			Consumption of fuel (Km/L)	6										
9. Perform maintenance of the camp (equipment, facilities)	9.1 Perform maintenance (outdoor)	Total value of each contract	Total costs of contracts	-									-	-
10. Repair and maintain intendancy material	10.1 Perform repair and maintenance (outdoor)	Total value of each contract	Total costs of contracts	-									-	-
11. Collect, group and evacuate salvage	11.1 Evacuate material	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	-									-	-
			Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										

		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of crew members	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
12. Perform burial and control assets	12.1 Evacuate bodies and belongings	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	-									-	-
			Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of crew members	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										

13. Provide resupply	13.1 Prepare material, equipment, food for shipment	Packing Costs	Cost of material to pack	300										R$ 300.00	R$ 30,109.20
		Cost of renting ground support equipment	Cost of renting	800										R$ 800.00	
		Fuel costs to operate ground support equipment	Consumption of fuel (L)	20										R$ 36.00	
	13.2 Transport material, equipment, food	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	2										R$ 26,894.00	
			Km traveled if truck (round trip)	-										-	
			Consumption of fuel (Km/L)	-											
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		R$ 2,079.20	
			Number of crew members	-	-	-	-	-	2	1	1	-			
			Number of travel days	2											
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		-	
			Number of drivers	-	-	-	-	-	-	-	-	-			
			Number of travel days	-											
14. Provide financial support	14.1 Payment of remuneration	Per diem to go to the place of mission	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman		R$ 1,039.60	R$ 372,128.00
			Number of team members	-	-	-	-	-	1	1	-	--			

			Number of travel days	2										
		Ticket price (round trip)	Value of ticket	-									-	
		Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	6									R$ 80,682.00	
			Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 2,079.20	
			Number of crew members	-	-	-	-	1	1	1	1	-		
			Number of travel days	2										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
		Additional of remuneration (2% for basic remuneration per day for the military of all air units in camp)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 288,327.20	
			Number of military in camp	2	8	11	15	34	47	32	51	20		
TOTAL COSTS PHASE 02													**R$ 433,383.96**	

Phase 03 - Demobilization (recovery of personnel and materials)														
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 11,374.40	R$ 11,374.40
			Number of team members	-	-	1		1	1	6	11	2		
			Number of days to disassemble the camp	2										
2. Load material, equipment, food, manpower	2.1 Prepare material, equipment, food for shipment	Packing Costs	Cost of material to pack	750									R$ 750.00	R$ 1,589.00
	2.2 Ship material, equipment, food at the camp area	Cost of renting ground support equipment	Cost of renting	800									R$ 800.00	
		Fuel costs to operate ground support equipment	Consumption of fuel (L)	20									R$ 36.00	
	2.3 Transport material, equipment, food, manpower from the camp area to the local of concentration 1	Fuel costs (military truck)	Km traveled (round trip)	10									R$ 3.00	
			Consumption of fuel (Km/L)	6										
3. Clean and prepare the terrain	3.1 Check necessity of special services	Total costs of service (earthwork, etc)	Cost of special services	-									-	-
4. Provide surface transportation	4.1 Transport food, material,	Fuel costs (flight hours	Flight hours (round trip)	6									R$ 80,682.00	R$ 82,761.20

	equipment, manpower from the local of concentration 1 to the local of concentration 2	or km/L) if military transport	Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										
		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 2,079.20	
			Number of crew members	-	-	-	-	1	1	1	1	-		
			Number of travel days	2										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
5. Unload material, equipment, food, manpower	5.1 Land material, equipment, food at local of concentration 2	Cost of renting ground support equipment	Cost of renting	-									-	R$ 24.00
		Fuel costs to operate ground support equipment	Consumption of fuel (L)	-									-	
	5.2 Transport material, equipment, food, manpower from the local of concentration 2 to the warehouse	Fuel costs (military truck)	Km traveled (round trip)	80									R$ 24.00	
			Consumption of fuel (Km/L)	6										

6. Provide manpower (Planners and Operators of CUI)	6.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 15,818.00	R$ 20,362.00
			Number of team members	-	-	-	-	-	-	6	4	-		
			Number of days to maintain the material	7										
		Ticket price (warehouse to Air Base of origin)	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	R$ 4,544.00	
			Number of team members	-	-	-	-	-	-	6	4	-		
			Value of ticket	-	-	-	-	-	-	124	950	-		
7. Repair and maintain intendancy material	7.1 Perform repair and maintenance (outdoor)	Total value of each contract	Total costs of contracts	2000									R$ 2,000.00	R$ 52,958.19
	7.2 Store material and equipment	Depreciation costs of material and equipment	% of depreciation	0.50%			1.50%			10%			R$ 50,958.19	
			Total costs of material and equipment	1490500			2079046			123200				
	7.3 Transport borrowed material or equipment	Fuel costs (flight hours or km/L) if military transport	Flight hours (round trip)	-									-	
			Km traveled if truck (round trip)	-									-	
			Consumption of fuel (Km/L)	-										

		Per diem for crew if military airplane	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of crew members	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
		Per diem for drivers if military truck	Workers/rank	Brigadier General	Colonel	Lieutenant Colonel	Major	Captain	Lieutenant	Master Sergeant	Sergeant	Airman	-	
			Number of drivers	-	-	-	-	-	-	-	-	-		
			Number of travel days	-										
TOTAL COSTS PHASE 03														**R$ 169,068.79**
TOTAL COSTS OF SUPPORT EVENT														**R$ 780,459.15**

Appendix DD: ABB Model - Estimate of Budget of Operation "ACISO BH 2013"

Screen 1 – Phase 01 Screen 1 – Phase 01

CELLULAR UNIT OF INTENDANCY				
ACTIVITY BASED BUDGET MODEL				
Phase 01 - Mobilization (preparation /concentration averages)				
Activities	**Tasks**	**Resource Drivers**	**Specification of Expenses**	**Average Cost of 1 Unit of Resource Drive**
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	Per diem	Weighted average value of Per Diem	R$212.40
		Ticket (round trip)	Average Cost of Tickets	R$500.00
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI	Per diem during preparation of material	Average Cost of Per Diem	R$212.40
3. Provide material and equipment	3.1 Buy material and equipment	Purchase	Total Cost of Purchases	R$15000.00
4. Provide food	4.1 Buy items to prepare and serve meals	Purchase	Total Cost of Purchases	R$25000.00
5. Surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)	Fuel (flight hours or km/L) if military transport	If airplane: Average Cost of Flight Hours	R$13,447.00
			If truck: Average Cost of Diesel (R$/L)	
6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp	Per diem for Planners and Operators of CUI while terrain is prepared	Weighted average value of Per Diem	R$212.40
7. Assembly the camp	7.1 Assembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is not totally assembled	Weighted average value of Per Diem	R$212.40
			ESTIMATE OF COST PHASE 01	**R$174,758.60**

CLEAN | PHASE 02 | PHASE 03 | SUMMARY

Screen 2 – Phase 02

CELLULAR UNIT OF INTENDANCY				
ACTIVITY BASED BUDGET MODEL				
Phase 02 - Operation (logistical support through time)				
Activities	**Tasks**	**Resource Drivers**	**Specification of Expenses**	**Average Cost of 1 Unit of Resource Drive**
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Weighted average value of remuneration	R$4,680.00
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower	Fuel to keep the power generator working	Average Cost of Diesel (R$/L)	R$1.80
3. Water supply	3.1 Provide water for consumption	Water for consumption	Average Cost of Water for consumption (R$/L)	R$0.50
4. Surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)	Fuel (military truck or bus)	Average Cost of Diesel (R$/L)	R$1.80
5. Resupply	5.1 Transport material, equipment, food	Fuel (flight hours or km/L) if military transport	If airplane: Average Cost of Flight Hours	R$13,447.00
			If truck: Average Cost of Diesel (R$/L)	
6. Finance	6.1 Payment of remuneration	Per diem to go to the place of mission	Weighted average value of Per Diem	R$212.40
		Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Weighted average value of remuneration	R$4,680.00
			ESTIMATE OF COST PHASE 02	**R$386,193.60**

CLEAN | PHASE 01 | PHASE 03 | SUMMARY

Screen 3 – Phase 03

CELLULAR UNIT OF INTENDANCY				
ACTIVITY BASED BUDGET MODEL				
Phase 03 - Demobilization (recovery of personnel and materials)				
Activities	**Tasks**	**Resource Drivers**	**Specification of Expenses**	**Average Cost of 1 Unit of Resource Drive**
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	Per diem for Planners and Operators of CUI while camp is disassembled	Weighted average value of Per Diem	R$212.40
2. Surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2	Fuel (flight hours or km/L) if military transport	If airplane: Average Cost of Flight Hours	R$13,447.00
			If truck: Average Cost of Diesel (R$/L)	
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI	Per diem during maintenance of material	Weighted average value of Per Diem	R$212.40
			ESTIMATE OF COST PHASE 03	**R$141,112.00**
CLEAN	PHASE 01	PHASE 02	SUMMARY	

Screen 4 - Summary

CELLULAR UNIT OF INTENDANCY	
ACTIVITY BASED BUDGET MODEL	
ESTIMATE OF COST PHASE 01	R$174,758.60
ESTIMATE OF COST PHASE 02	R$386,193.60
ESTIMATE OF COST PHASE 03	R$141,112.00
ESTIMATE OF TOTAL COST PER SUPPORT EVENT	**R$702,064.20**
ESTIMATE OF TOTAL COST PER YEAR (6 SUPPORT EVENTS)	**R$4,212,385.20**

CLEAN | PHASE 01 | PHASE 02 | PHASE 03

Screen 5 – Macros

Activities	Tasks	Total demand of activities consumed (per year)	Resource Drivers	Specification of Resource Drivers	Consumption Rates of Resource Drivers (per support event)	Total demand of resource drivers consumed (per year)	Average Cost of 1 Unit of Resource Drive	Partial Costs per Resource Drive	Partial Costs per Activity per Support Event	Partial Costs per Activity per Year (06 support events)
Phase 01 - Mobilization (preparation /concentration means)										
1. Perform precursory visit	1.1 Visit the place where the deployment will be performed	6	Per diem	Number of military	3	18	R$ 212.40	R$ 2,196.60	R$ 3,696.60	R$ 22,179.60
				Number of days	3	18				
			Ticket (round trip)	Number of military	3	18	R$ 500.00	R$ 1,500.00		
2. Provide manpower (Planners and Operators of CUI)	2.1 Receive Planners and Operators of CUI		Per diem during preparation of material	Number of military	6	36	R$ 212.40	R$ 6,942.00	R$ 6,942.00	R$ 41,652.00
				Number of days	5	30				
3. Provide material and equipment	3.1 Buy material and equipment		Purchase	Number of purchases	1	6	R$ 15,000.00	R$ 15,000.00	R$ 15,000.00	R$ 90,000.00
4. Provide food	4.1 Buy items to prepare and serve meals		Purchase	Number of purchases	1	6	R$ 25,000.00	R$ 25,000.00	R$ 25,000.00	R$ 150,000.00
5. Surface transportation	5.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2 (close to the place where the deployment will be performed)		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48	R$ 13,447.00	R$ 107,576.00	R$ 107,576.00	R$ 645,456.00
				Km (round trip)	4000	24000	R$ 0.00	R$ 0.00		
				Consumption of fuel (Km/L)	6	36				

6. Clean and prepare the terrain	6.1 Prepare the terrain to assembly the camp		Per diem for Planners and Operators of CUI while terrain is prepared	Number of military	20	120	R$ 212.40	R$ 6,148.00	R$ 6,148.00	R$ 36,888.00
				Number of days	1	6				
7. Assembly the camp	7.1 Assembly tents, machines, equipment		Per diem for Planners and Operators of CUI while camp is not totally assembled	Number of military	20	120	R$ 212.40	R$ 10,396.00	R$ 10,396.00	R$ 62,376.00
				Number of days	2	12				
ESTIMATE OF COST PHASE 01									**R$ 174,758.60**	**R$ 1,048,551.60**
Phase 02 - Operation (logistical support through time)										
1. Provide manpower	1.1 Delegate functions to staff (Planners and Operators of CUI)	6	Additional of remuneration (2% of basic remuneration per day for Planners and Operators of CUI)	Number of military that will receive the additional	20	120	R$ 4,680.00	R$ 28,080.00	R$ 28,080.00	R$ 168,480.00
2. Provide electrical power	2.1 Provide electricity for lamps, power outlets, air conditioner/heater, shower		Fuel to keep the power generator working	Consume of fuel (per day)	120	720	R$ 1.80	R$ 3,240.00	R$ 3,240.00	R$ 19,440.00
3. Water supply	3.1 Provide water for consumption		Water for consumption	Consumption of water (Liters per person/per day)	2	12	R$ 0.50	R$ 3,750.00	R$ 3,750.00	R$ 22,500.00

4. Surface transportation	4.1 Transport material, equipment, food and people (camp area/city/camp area or camp area/runway/camp area)		Fuel (military truck or bus)	Km (per day)	60	360	R$ 1.80	R$ 270.00	R$ 270.00	R$ 1,620.00
				Consumption of fuel (Km/L)	6	36				
5. Resupply	5.1 Transport material, equipment, food		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	2	12	R$ 13,447.00	R$ 26,894.00	R$ 26,894.00	R$ 161,364.00
				Km (round trip)	2000	12000	R$ 0.00	R$ 0.00		
				Consumption of fuel (Km/L)	6	36				
6. Finance	6.1 Payment of remuneration		Per diem to go to the place of mission	Number of military	2	12	R$ 212.40	R$ 1,039.60	R$ 323,959.60	R$ 1,943,757.60
				Number of days	2	12				
			Additional of remuneration (2% of basic remuneration per day for the military of all air units in camp)	Number of military that will receive the additional	230	1380	R$ 4,680.00	R$ 322,920.00		
ESTIMATE OF COST PHASE 02									**R$ 386,193.60**	**R$ 2,317,161.60**
Phase 03 - Demobilization (recovery of personnel and material)										
1. Disassembly the camp	1.1 Disassembly tents, machines, equipment	6	Per diem for Planners and Operators of CUI while camp is disassembled	Number of military	20	120	R$ 212.40	R$ 10,396.00	R$ 10,396.00	R$ 62,376.00
				Number of days	2	12				

2. Surface transportation	2.1 Transport food, material, equipment, manpower from the local of concentration 1 to the local of concentration 2		Fuel (flight hours or km/L) if military transport	Flight hours (round trip)	8	48	R$ 13,447.00	R$ 107,576.00	R$ 107,576.00	R$ 645,456.00
				Km (round trip)	4000	24000	R$ 0.00	R$ 0.00		
				Consumption of fuel (Km/L)	6	36				
3. Provide manpower (Planners and Operators of CUI)	3.1 Receive Planners and Operators of CUI		Per diem during maintenance of material	Number of military	20	120	R$ 212.40	R$ 23,140.00	R$ 23,140.00	R$ 138,840.00
				Number of days	5	30				
ESTIMATE OF COST PHASE 03									**R$ 141,112.00**	**R$ 846,672.00**
ESTIMATE OF TOTAL COSTS									**R$ 702,064.20**	**R$ 4,212,385.20**

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14. ABSTRACT

During a military operation, besides providing technological infrastructure and specific weapons, it is also essential to have physical logistics to support the basic needs of troops. To provide this specific care, the Brazilian Air Force (BAF) has the Cellular Unit of Intendancy (CUI). Annually several support operations are planned, and events that cannot be predicted are estimated. Currently, the estimated budget and the report of total costs calculated after missions do not reflect the reality of the CUI expenses. The estimated budget presents values much lower than those presented in the reports of total costs, prepared after finishing each support event, and the report of total costs covers only a few activities performed in each support event. This gives the decision makers the erroneous impression that there are sufficient resources for accomplishing all objectives established. The Activity-Based Costing (ABC) and the Activity-Based Budget (ABB) systems were used in this research to generate the ABC and ABB models of calculation that will allow planners (officers) to provide more precise estimates of budgets and more accurate reports of total costs, based on the cost of the activities performed in each support event. These models will allow the decision makers to better plan the financial applications for the CUIs and to have more control of the existing resources. With this, the CUIs will be able to provide with excellence all activities needed to maintain the well-being and the morale of the troops deployed and, consequently, help to improve the overall results of the BAF missions.

15. SUBJECT TERMS
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