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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

**OUTSOURCING STRATEGIC SERVICES IN THE COLOMBIAN
DEFENSE SECTOR:
ANALYSIS OF A NAVAL AVIATION CASE**

by

Alberto E. Godoy

December 2007

Thesis Advisor:
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**OUTSOURCING STRATEGIC SERVICES IN THE COLOMBIAN DEFENSE SECTOR:
ANALYSIS OF A NAVAL AVIATION CASE**

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MASTER OF SCIENCE IN DEFENSE ANALYSIS

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ABSTRACT

The Colombian Navy (COLNAV) has been outsourcing flight services from a private company since 2003 in order to provide transportation for troops and military cargo as well as general logistical support. The Colombian Naval Aviation's (AVNA) lack of proper equipment to perform these types of missions in a cost-efficient manner has required the senior naval command to sign iterative contracts over four years, with a private contractor. The contract is with one of the two companies with such a capacity in the country, and the only one with the resources available to accomplish the terms of contract.

Such limitations have developed a highly-dependent relationship with one supplier resulting in a non-beneficial agreement for COLNAV, especially considering the sensitive security implications of the internal Colombian context generated by the Narco-terrorist Organizations (ONT) within the national borders.

This situation will be analyzed from a managerial perspective, and using a Game Theory approach, present four possible alternatives in order to strengthen COLNAV's bargaining position when dealing with a sole source of aviation services and, thus, improve the Naval Aviation's capabilities in the long run.

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LIST OF ACRONYMS AND ABBREVIATIONS

AVNA – Colombian Naval Aviation

BRIFLIM – Colombian Marine Corps Fluvial Brigade

BRIM1 – Colombian Marine Corps Infantry Brigade in the Caribbean

BRIM2 – Colombian Marine Corps Infantry Brigade in the Pacific

COLAR – Colombian Army

COLMIL – Colombian Military Forces

COLMAR – Colombian Marine Corps

COLNAV – Colombian Navy

FARC – Colombian Revolutionary Armed Forces

FNC – Caribbean Naval Force

FNP – Pacific Naval Force

FNS – Southern Naval Force

GANCA – Caribbean Naval Aviation Group

GANPA – Pacific Naval Aviation Group

GATAF – Naval Aviation Group of Fluvial Support and Transportation

MDN – Ministry of Defense

ONT – Narco-terrorist Organizations

RAC – Colombian Aeronautical Regulations

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To Cecy, Juangui, and Sofy, my best reasons

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I. INTRODUCTION

It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order.

Machiavelli

A. THE COLOMBIAN NAVY IN CONTEXT

Colombia is a privileged country. The diversity of its territory permits all kind of crops to grow with ease; several rivers within the national geography allow Colombians from all the cardinal points to communicate through “fluvial highways”; shores on two oceans, the Atlantic and the Pacific, provide the nation with access to a worldwide spectrum of opportunities. Ironically, Colombia’s greatest natural resources are also the reason for its biggest concerns.

The Colombian Navy (COLNAV), through one of its components, the Colombian Marine Corps (COLMAR), is responsible for controlling its national rivers including denying their use to the Narco-terrorists Organizations (ONT) as a means of transporting collateral materials from urban centers to the drug-processing labs in the jungle, and then from the jungle to their improvised wharves on the coast.

COLMAR also has military jurisdiction over a portion of the northern Colombian territory known as “Montes de Maria” (Figure 1), considered to be the ONT’s mobility corridor to the Atlantic coast.

Taking into account the vast territories and constraints that shape the state’s forces, the Colombian Military Forces (COLMIL) in general and COLMAR in particular, support their strength with the ability to efficiently deploy the required military power to any given point within a brief period of time. Therefore,

air support is mandatory, not only to create a credible deterrence, but also to effect real coercion against the enemies of the nation.

Consequently, almost a decade ago, the Colombian Naval Aviation (AVNA) restructured its mission to meet the demands of the country's security. From a strategically oriented component, naval aviation turned into a tactical element, diverting and specializing parts of its resources to support COLMAR's mission inside Colombian territory.



Figure 1. The Colombian Navy's Territorial Jurisdiction

From: World Atlas, available at:

<http://worldatlas.com/webimage/countrys/samerica/lgcolor/cocolor.htm>

Over time, the troops' high-mobility demands and logistical needs highlighted COLNAV's limitations in air equipment. Therefore, almost since its new role was implemented, AVNA's command realized the need for larger aircraft to support COLMAR's operations.

Resulting from the operational experience, COLNAV's ground forces' additional air requirements were defined in terms of two heavy helicopters permanently deployed, one on the Pacific coast and another on the Atlantic, with a minimum transportation capacity of 24 soldiers, fully equipped, or 4 tons of payload.

After a market study in the country, it was determined that the helicopter that best fit these requirements (and was also currently operating in Colombia) was the Russian MI-17 (Figure 2). This decision was supported by the fact that the Colombian Army (COLAR), an enthusiastic proprietor of this type of aircraft, reported outstanding operating performance in all weather conditions of the Colombian topography.

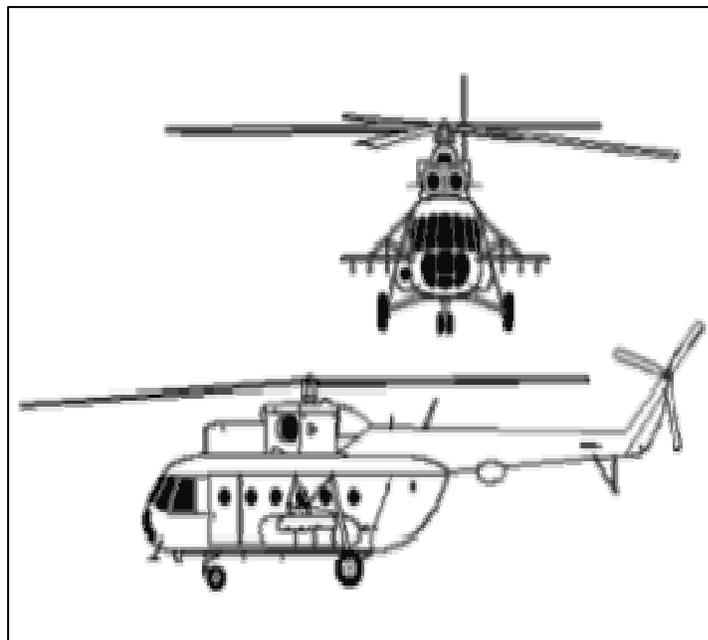


Figure 2. Helicopter MI-17

From: FAS Military Analysis Network, available at <http://www.fas.org/man/dod-101/sys/ac/row/mi-17.htm>

Based upon the available resources during the initial decision-making process, COLNAV decided to outsource the required service instead of purchasing the aircraft. At this point, such a decision was viewed as a provisional measure to solve an urgent problem; however, it has been four years since then without the promulgation of any project that seeks to provide massive air mobility and logistic support for COLNAV.

B. OUTSOURCING DEFENSE SERVICES IN COLOMBIA: UNDERSTANDING THE MARKET'S NATURE

The defense sector in Colombia is strongly shaped by two factors: the governmental economic restrictions and the reduced number of private contractors with the required capacities. Also, legal restrictions inherited from the pre-open-market economy period, protecting domestic companies from foreign competitors, contribute greatly to defining the terms of negotiations faced by COLNAV when outsourcing strategic air services.

According to AVNA's "*Estudio de Conveniencia y Oportunidad Complementario*" (Opportunity and Convenience Complementary Study), there are only two companies in Colombia with the required capacities to accomplish the proposed types of missions. These companies are Vertical de Aviacion and Helistar S.A.; however, since 2003, the former has been the only offering company due to the lack of equipment availability from the latter. Moreover, according to the Colombian Aeronautical Regulations (RAC), it is against the law to contract foreign companies to operate aircraft within the country if there are competent national companies to execute the proposed mission.

In conclusion, COLNAV's spectrum of possibilities has been reduced to only one supplier of air support, *Vertical de Aviacion* (VA), a situation that not only leaves COLNAV in a disadvantaged position in the face of an almost-monopolized business, but also introduces critical limitations to the planning and execution phases of any COLMAR military operation involving air support.

C. STATEMENT OF PURPOSE

This thesis begins analyzing the COLNAV – VA relationship from a managerial perspective using theoretical frames that define the supply chain management principles. The strengths, weaknesses, threats, and opportunities to COLNAV, as a sole source of private air support, are identified.

Air support is a core competency, not only to COLMIL, but also to any regular military force in the world. Therefore, once the theoretical frame describing in managerial terms, the pros and cons of COLNAV's agreement regarding air support is defined, this thesis will address the same issue as a matter of strategic interest to the country and COLNAV. It will also address the intangible but essential factors that highlight the importance of air support to accomplish COLNAV's constitutional mission.

Next, a game theory model will be implemented assuming COLNAV and VA as rational actors in order to describe a potential bargaining process at which both parts seek to obtain the greatest benefits for themselves. Conclusions obtained from the previous chapters of this thesis will be introduced in the game in order to support a matrix of possible outcomes for both players.

D. HYPOTHESIS AND RESEARCH QUESTIONS

The Colombian Navy should develop a short-term project to in-source the service's requirements of air support, in order to implement its current operational capabilities, reduce risks derived from being in a weak position and in a non-favorable commercial relationship, and optimize the use of the fiscal funds assigned.

COLNAV, facing increasing threats due to the Narco-terrorists Organizations (ONT) use of Colombian jurisdictional waters to transport illicit drugs and weapons, is required to keep its personnel, equipment, machinery, and weaponry at the highest level of readiness to deny the exploitation of the rivers and seas for illicit purposes. Outsourcing flight services from a private

contractor, in order to move troops and logistics, reduces COLNAV's capacities to meet the operational demands derived from an increasingly complex internal conflict. Moreover, depending on a sole source of supply puts COLNAV in a disadvantageous position, denying opportunities to obtain a favorable agreement in terms of costs, and increasing the amount of risks resulting from being in a weak bargaining position.

To prove this hypothesis, the following questions should be addressed:

1. *What are COLNAV's air support needs?*
2. *Are COLNAV's air support needs met under the current terms of agreement with Vertical de Aviacion?*
3. *Does the current relationship between COLNAV and Vertical de Aviacion provide the former with benefits that justify a long-term relationship?*
4. *What options or arguments are available to COLNAV in a negotiation process that would improve its current relationship with Vertical de Aviacion?*
5. *From a managerial perspective, is insourcing of air support a better option for COLNAV?*

E. METHODOLOGY AND ORGANIZATION

There are several authors and studies that focused their interest in defining the principles of supply chain management. They analyze the relationships between the buyer and the supplier, as well as the particular context of the agreement, in order to identify opportunities to improve the participants' outcomes. However, when it is about outsourcing critical services supporting the strategic capacities of a country's defense sector, there are a number of intangible variables that need to be considered in order to identify the real dimension and priority of the relationship between government and contractors.

Chapter II provides an overview of COLNAV's organization and its roles within the Colombian context of internal conflict. This chapter defines the needs for air support and brings into context the current agreement between COLNAV and *Vertical de Aviacion* and introduces the economic and legal constraints that shape it.

Chapter III addresses the conceptual models defining the supply chain management principles. The chapter encloses the COLNAV – *Vertical de Aviacion* agreement into a theoretical frame, highlighting COLNAV'S threats and opportunities in front of a player situated in a stronger position. Arguments from this chapter are intended to support future projects presenting COLNAV's need for insourcing air support at higher levels of the Colombian government.

Chapter IV presents a game theory approach modeling a hypothetical negotiation process between COLNAV and *Vertical de Aviacion*. This model adopts Allison and Zelikow's theoretical frame, defining both players as rational actors, and introduces air-capacity strategic value as the principal factor determining COLNAV's decisions. The purpose of this chapter is to provide COLNAV's decision-makers with an alternative approach for future negotiation processes with *Vertical de Aviacion*, in order to strengthen the government position in the agreement.

The concluding chapter summarizes the previous points and provides recommendations on how COLNAV can improve its current bargaining position as well as prepare the terrain to develop an internal air capacity that meets the demands of the country's internal conflict.

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II. OVERVIEW

The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore, all progress depends on the unreasonable man.

George Bernard Shaw

This chapter presents a synopsis of the structural organization and roles developed by the Colombian Navy. It defines the need for air support for its missions and the economic and legal constraints that shape the Colombian defense fund allocation and official contracting processes. These processes are brought to light in order to understand the reasons considered in the decision-making process for the current agreement between COLNAV and the private company providing air support to COLMAR's troops.

A. THE COLOMBIAN NAVY'S ORGANIZATIONAL STRUCTURE

The Colombian Political Constitution¹, under Title VII, Articles 216, 217, and 219, defines the Colombian Military Forces (COLMIL) primordial function and sets the basis for its organizational structure. According to this document, COLMIL has two main functions: (1) defense of the country's sovereignty and independence and (2) integrity of the national territory and constitutional order.

In order to allow COLMIL to attain its second objective, the Presidency of Colombia, through its Ministry of Defense (MDN), assigned portions of the country's territory to each service. According to its constitutional mission,² COLNAV needs to "...exert presence and sovereignty over the Caribbean Sea

¹ *Constitución Política de Colombia*, (The Colombian Political Constitution), available at <http://www.cna.gov.co/cont/documentos/legislacion/constitucion.pdf>, p.62, Internet, accessed 07/26/07.

² *Armada Nacional Republica de Colombia* (The Republic of Colombia National Navy), available at www.armada.mil.co, Internet, accessed 07/30/07.

and the Pacific Ocean, as well as the Colombian fluvial arteries and different land jurisdictions with the purpose of maintaining territorial integrity and constitutional order.”³

The COLNAV human and material resources are distributed in three naval forces located in the Caribbean, the Pacific, and the Amazon River. Both the Caribbean Naval Force (FNC) and the Pacific Naval Force (FNP) have operational control over a COLMAR brigade (BRIM-1 and BRIFLIM-2, respectively) located within their military jurisdiction, while the Southern Naval Force (FNS) has operational control over a COLMAR fluvial brigade (BRIFLIM-1) with headquarters in Bogota.

According to COLNAV’s web-page,⁴ there are 12,660 kilometers (7,867 miles) of navigable rivers in Colombia; 8,155 kilometers (5,067.5 miles) of them are covered by two COLMAR fluvial brigades. COLNAV also has 40,835 square kilometers (25,374.9 square miles) of territorial jurisdiction located in the northern region of the country. This area, which is known as “*Montes de Maria,*” is part of the FNC military jurisdiction and has a strategic value for the *Fuerzas Revolucionarias de Colombia (FARC)*. It fronts numbers 35 and 37, as a mobility corridor, to transport illicit drugs from the country’s southern jungles to improvised wharves on the Caribbean coast, and then to the black markets in Central and North America, and Europe.

Therefore, FNC demands from its COLMAR component, BRIM-1, to permanently conduct military operations in order to keep the ONTs from using the rivers and its surrounding territories to achieve their goals. However, taking into account the vast territories that need to be covered by three regular battalions and two counter-guerrilla battalions integrating BRIM-1⁵ FNC, as well

³ Jurisdicción de la Armada de la Republica de Colombia (Colombian Navy’s Jurisdiction), available at: <http://www.armada.mil.co/index.php?idcategoria=183>, Internet, accessed 07/30/07.

⁴ Ibid.

⁵ *Comando de Infantería de Marina – BRIM-1 (Marine Corps Command – BRIM-1)* available at <http://www.armada.mil.co/index.php?idcategoria=537836>, Internet, accessed 07/30/07.

as the other Colombian naval forces, is highly dependent on air support in order to exert opportune military presence and thus deter and coerce the ONTs in its jurisdiction.

The Colombian Naval Aviation (AVNA) is a supporting unit organized in three squadrons or groups: the Caribbean Naval Air Group (GANCA), the Pacific Naval Air Group (GANPA), and the Naval Air Group of Fluvial Support and Transportation (GATAF). GANCA and GANPA were conceived to support FNC and FNP respectively, developing maritime and ground troop support operations, while GATAF, with headquarters in Bogota, is responsible for providing air back-up to FNS' fluvial operations.

The list of rotary-wing assets comprising AVNA is integrated by five Bell-412 helicopters and one Bell-212 helicopter employed as Command and Control units. There are also two AS555SN, one BK-117, and two BO-105 helicopters engaged in maritime operations and close-range fire support missions.⁶ Due to the abruptness of the Colombian territory, and the reduced number of safe airfields on regions separated from the centers of population, the employment of fixed-wing assets is limited to logistic missions from one major city to another as well as advanced command and control stations in support of rotary-wing aircraft missions.

COLNAV current tactical and operational doctrines reflect US Navy, US Coast Guard, and US Marine Corps practices. Troops' readiness, quick reaction, and air mobility are the pillars on which COLMAR founds its operations. In fact, considering that human and material assets are the critical variable in the organization, the ability to rapidly concentrate a number of troops and efficiently deploy them to an area under attack, in a reduced amount of time, instead of

being an option, is COLMAR's only approach to a prolonged conflict. This conflict has been set up this way by the ONTs in an effort to defeat the state's forces by draining its resources over time.

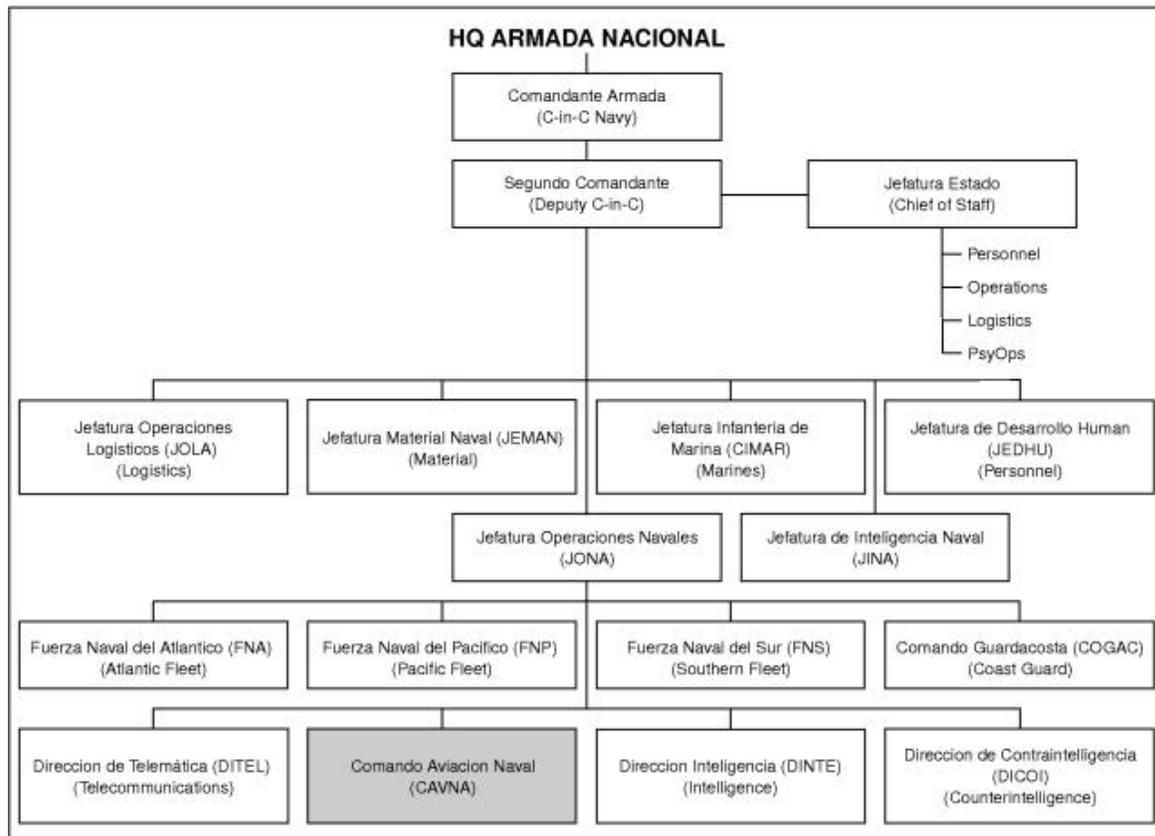


Figure 3. COLNAV Structural Organization

From: Jane's Sentinel Country Risk Assessments, available at: <http://www2.janes.com/janesdata/sent/samsu/images/g0547511.jpg>, accessed 08/02/07

⁶ "JANE'S Sentinel Country Risk Assessments", available at: http://www4.janes.com/subscribe/sentinel/SAMS_doc_view.jsp?Sent_Country=Colombia&Prod_Name=SAMS&K2DocKey=/content1/janesdata/sent/samsu/colos130.htm@current#top, Internet, accessed 08/02/07.

The Colombian operational experience has showed that heavy helicopters⁷ are vital to execute and sustain efficient military operations. Unfortunately, AVNA cannot provide such supports to COLMAR with its current resources. In 2003, COLNAV decision-makers started seeking ways to provide the naval ground and fluvial forces with the air support they demanded. Their decisions were constrained by two factors: (1) the available budget, and (2) the current budget's official execution laws. A brief description of the Colombian process of budget execution will be described in order to understand the course of actions adopted by COLNAV leaders in 2003.

B. MANAGING OFFICIAL FUNDS IN COLOMBIA: UNDERSTANDING THE PROCESS OF PUBLIC ADMINISTRATION

The Colombian fiscal year runs from January 1 to December 31. According to "*Estatuto Orgánico del Presupuesto General de la Nación*" (*Organic Statute for the Nation's General Budget*),⁸ the Colombian official funds are composed by the Budget of Rents, the Budget of Expenses, and the fiscal year's General Dispositions.⁹ The former relates the amount of available funds, according to the estimated taxes that will be collected in the current fiscal period, while the latter shows the distribution of those funds among the ministries and administrative departments. The fiscal year's General Dispositions comprise a number of specific norms and regulations that are effective for only one period and provide a general guideline to ensure the proper execution of funds.

The Budget of Expenses provides operational funds only, which means that investments in new equipment cannot be made with these resources. If COLNAV wants to buy new equipment (i.e. new helicopters) or upgrade an existing one, it is mandatory for the service to submit a project to "*Banco*

⁷ Heavy helicopters will be used in this document to signify rotary-wing aircraft capable of transporting more than 4 tons of payload.

⁸ "Secretaria del Senado – Republica de Colombia" (Secretary of the Senate – Republic of Colombia), available at: http://www.secretariasenado.gov.co/leyes/D0111_96.HTM, Internet, accessed 08/05/07.

⁹ Ibid, article 11.

Nacional de Programas y Proyectos” (*National Programs and Projects’ Bank*).¹⁰ According to the Colombian budget statute, this organization approves funds to those projects considered viable socially, technically, and economically, and registered at “*Departamento Nacional de Planeacion*” (National Department of Planning).

It usually takes three to four years, after getting approval, for a project to be funded, and another year or two to be executed. Investment projects are also extremely time and energy consuming — it normally takes a year to prepare a project — because they need to justify to congress the need for additional funds in such a way that it cannot be refuted, even by the most radical leftist congressman in the House.

In the case of COLNAV and the need for massive air support, a potential project should include not only new helicopters and training, but also new personnel — the number of COLNAV’s pilots and mechanics is a critical factor for the service¹¹ — new facilities,¹² and an increment in the operational funds (Budget of Expenses) to cover the new demands of fuel, maintenance of equipment, and installations.

By the time COLNAV decision-makers started looking for ways to provide troops with effective air support, they already knew that a project to acquire heavy helicopters would be almost impossible to accomplish in the near future considering the country’s economic restrictions and priorities. Therefore, they conceived another strategy: the outsourcing of air support.

The Organic Statute for the Nation’s General Budget, or simply the *Budget’s Law* as it is commonly known in Colombia, provides a monetary reserve

¹⁰ “Secretaria del Senado – Republica de Colombia” (Secretary of the Senate – Republic of Colombia), article 9.

¹¹ According to AVNA’s recent Order of Battle, the pilot-to-aircraft ratio was 2.5:1.

named “*Fondo de Compensacion Interministerial*” (Inter-ministerial Compensation Fund),¹³ whose annual amount could be up to 1% of the nation’s current income. These resources are incorporated into the budget for covering gaps in the operational funds of entities and official organizations, during the fiscal period, and according to the President and his council of ministers’ criteria.

In January of 2003, COLNAV’s leaders presented an official request to the council of ministers demanding additional funds to provide massive air support to the troops.¹⁴ In March of the same year, the COLNAV operational budget received an additional US\$3,930,020¹⁵ to negotiate and execute a contract with a company capable of providing the required flight services.

C. SELECTING THE CONTRACTOR

COLNAV defined the need for air support according to the following terms:

The Colombian Navy requires a company capable of providing rotary-wing flight services to transport up to 24 fully-equipped soldiers or 4 tons of payload within the Colombian national borders. The aircraft’s minimum flight autonomy should be of 3 hours and 30 minutes and an operational flight radius of at least 125 nautical miles

¹² AVNA’s current facilities cannot support the operation and maintenance of two heavy helicopters. There is a project underway seeking approval to translate the actual facilities in Cartagena, 60 miles north, to Barranquilla, in order to gain more space to build new hangars and installations. The area in which the actual facilities are placed do not permit any improvement because it generates a conflict with the city’s international airport development project.

¹³ *Estatuto Organico del Presupuesto General de la Nacion* (Organic Statute for the Nation’s General Budget) article No. 70, available at: http://www.dnp.gov.co/archivos/documentos/DDTS_Gestion_Publica_Territorial/1bnormatividadLey38_89.pdf, internet, accessed 08/25/07.

¹⁴ Information extracted from “*Estudio de Conveniencia y Oportunidad*” (Convenience and Opportunity Study), a document required—according to “*Estatuto General de Contratacion Publica*” (*General Statute of Public Contracting*) Law 80, article 25—to evaluate and approve the object of the contract, based on the nation’s convenience. The document in question is not available to the public due to the classified nature of the information that it comprises; however, important statistical data can be extracted from it without violating any security clearance.

¹⁵ Currency conversions are made using an equivalent of 1 dollar:2100 pesos, based on the 2007 Colombian economic indicators available at: <http://www.banrep.org/>, internet, accessed 08/25/07.

Offering companies should have at least 3 helicopters of such characteristics to be employed as follows: two helicopters permanently deployed in the Caribbean Naval Force – Cartagena – and the Pacific Naval Force – Bahia Malaga – respectively, and one helicopter available in case of operational emergencies, capable of immediate reaction to support the troops in the geographic area that the COLNAV demands.

The costs of the contract should include those derived from the helicopter's maintenance and operation, including but not limited to aircraft's pilots and mechanics, combustible and lubricants.¹⁶

The first obstacle COLNAV found in the process of selecting the supplier of flight services was at the "*Reglamentos Aeronauticos de Colombia, (RAC)*" (Colombian Aeronautic Regulations). According to the document, *Aerocivil*¹⁷ will grant temporary operation permits to foreign-licensed aircraft to operate in Colombia, but only in the absence of national aircraft capable of doing the proposed missions.¹⁸

This clause shut the door in the face of a number of foreign companies offering flight services to COLNAV. Worse, it left the government at the mercy of the only two Colombian companies with the required aircraft to perform the demanded service: *Helistar Ltda.* and *Vertical de Aviacion*.¹⁹

Helistar Ltda., owner of three Russian MI-17 helicopters and a number of American Bell light-helicopters, has been the main supplier of air services to the Colombian Oil Company (ECOPETROL) and thus a considerable percentage of

¹⁶ Extracted from AVNA's "*Estudio de Conveniencia y Oportunidad*" (Convenience and Opportunity Study), February of 2003, free translation to English by the author.

¹⁷ Aerocivil is the abbreviated version of "Unidad Administrativa Especial de *Aeronautica Civil*" (Special Administrative Unit of Civil Aeronautics) the Colombian entity regulating the employment of the national air-space.

¹⁸ *Reglamentos Aeronauticos de Colombia, RAC*, (Colombian Aeronautic Regulations), Part Three, Item 6.3.7.5, p. 73, available at: http://www.aerocivil.gov.co/RAC/Parte3/PARTE_TERCERA.pdf, Internet, downloaded 08/20/07.

¹⁹ Information about these companies is available at: <http://www.helistaraviacion.com>, and <http://www.verticaldeaviacion.com/>, internet, accessed 08/12/07.

its assets are devoted to honor this long-term contract.²⁰ Therefore, *Vertical de Aviacion* has been the only company available to COLNAV since 2003 due to the lack of equipment availability from its competitors.

Vertical de Aviacion, the country's largest non-regular civil-aviation company, started operating in 1982 with Bell equipment, and according to its web-page, was the first company in the world offering commercial services for load and passenger transportation using Russian aircraft. Today, the company owns fourteen MI-17s and a number of Bell 222 and Bell 212 helicopters. *Vertical de Aviacion* not only sells flight services and maintenance to the Colombian government, but also to Mexico, Ecuador, Peru, Bolivia, the United States Department of Defense, and the American embassy in Colombia.

Moreover, *Vertical de Aviacion* controls the civil non-regular air transportation in Colombia. According to *Aerocivil* statistics, the company's helicopters moved 57.58% of the total cargo and 49.71% of the total personnel, using rotary-wing aircraft as a means of transportation, in Colombia during 2006.²¹

Taking into consideration the characteristics of the rotary-wing industry in Colombia, the contractor's selection should have been an easy task for the COLNAV decision-makers: *Vertical de Aviacion* has been the only option available since 2003. Both sides, supplier and supplied, are aware of it.

According to AVNA's latest market research,²² as a requisite to sign the current fiscal year's contract, *Vertical de Aviacion* will charge the navy an amount of US\$5,497 per flight hour during 2007. Considering the funds assigned to

²⁰ Information extracted from AVNA's "Estudio de Conveniencia y Oportunidad Complementarios – Anexo B, Estudio de Mercado" (Convenience and Opportunity Complementary Study – Annex B, Market Research), January of 2007.

²¹ "Boletín Trimestral No-Regular" (Non-regular Quarterly Report), available at: <http://www.aerocivil.gov.co/>, internet, accessed 08/12/07.

²² AVNA's "Estudio de Conveniencia y Oportunidad Complementarios – Anexo B, Estudio de Mercado" (Convenience and Opportunity Complementary Study – Annex B, Market Research), January of 2007.

COLNAV to cover this agreement, the COLMAR troops would have an average of only 20 hours of flight support per month in the Caribbean and the Pacific.²³

Table 1 provides a summary of the costs incurred by COLNAV in order to provide flight transportation to the COLMAR troops and cargo. From the graphic below, it is evident that there is a decreasing tendency in the funds allocated to cover the contract with *Vertical de Aviacion*. This, along with the fact that Colombia is an inflationary economy (on average, inflation increases 6% per year²⁴) denotes that in the near future, the funds allocated will be insufficient to cover the required services.

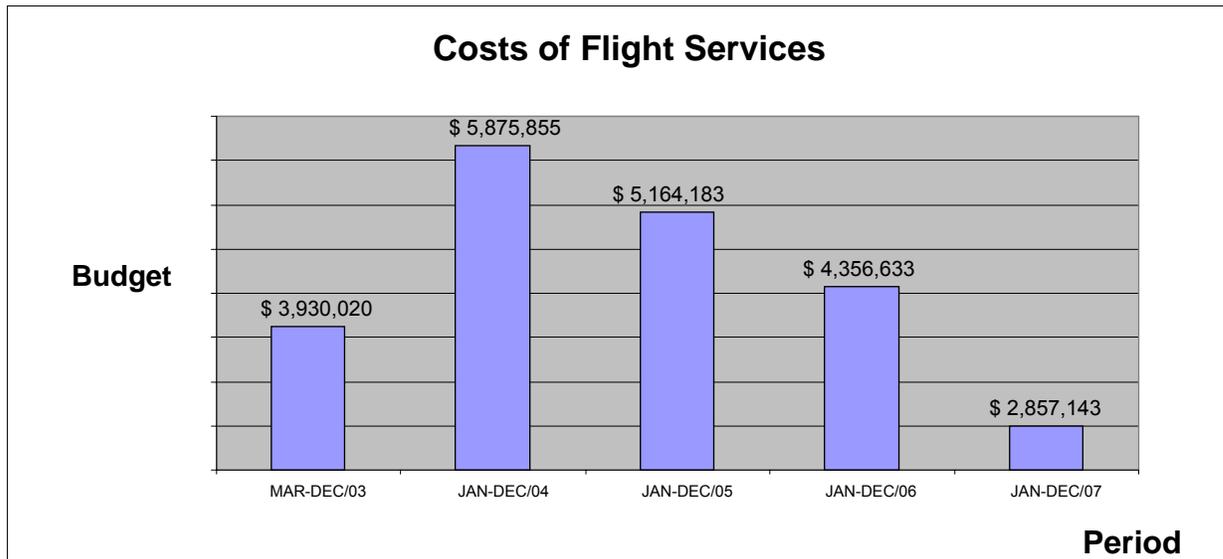


Table 1. Costs of Flight Services

From: AVNA’s “Estudio de Conveniencia y Oportunidad” (Convenience and Opportunity Study), January of 2007 (Values in US Dollars)

²³ According to AVNA’s “Estudio de Conveniencia y Oportunidad” (Convenience and Opportunity Study), January of 2007, this year’s funds’ allocation was US\$2,857.143.

²⁴ *Banco de la Republica de Colombia – Indicadores Economicos* (The Republic of Colombia’s Bank – Economic Indicators), available at: <http://www.banrep.gov.co/>, Internet, accessed 08/24/07.

D. CONCLUSION

This chapter showed the structural organization of COLNAV to accomplish its constitutional mission of defending the integrity of the national territory. It was also proven that the actual resources the institution counts on are insufficient to cover the areas under its jurisdictional responsibility. COLNAV assets are geographically concentrated and highly dependent on air mobility in order to keep the ONTs from acting against the law and constitutional order. However, since AVNA has neither the helicopters to provide the troops with massive transportation nor funds to purchase new and larger aircraft, COLNAV needed to find a way to fulfill this requirement using external resources.

The Colombian aeronautical regulations forbidding foreign competition reduced COLNAV's options of flight service outsourcing to only one: *Vertical de Aviacion*. This resulted in an unfavorable agreement for COLNAV, assuming a weak bargaining position in front of a sole-source supplier. The amount of funds allocated each year to cover this agreement is decreasing and the possibility that *Vertical de Aviacion* will decide to manipulate the terms of the contract in its favor before finishing it, is a significant threat for COLNAV.

It is imperative to find alternatives to improve COLNAV's current position with respect to its flight services provider. Paraphrasing George Bernard Shaw again, progress rewards unreasonable thinking. However, for innovative approaches to be realistic, a detailed understanding of the problem — the COLNAV-*Vertical de Aviacion* relationship in this case — is required. That is the proposed goal of the following chapter.

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III. OUTSOURCING DEFENSE SERVICES IN COLOMBIA: A MANAGERIAL ANALYSIS

“Would you tell me, please, which way I ought to go from here?” asked Alice.

“That depends a good deal on where you want to get to,” said the Cat.

“I don’t much care where...,” said Alice.

“Then it doesn’t matter which way you go,” said the Cat.

“...so long as I get SOMEWHERE,” Alice added as an explanation.

“Oh, you’re sure to do that,” said the Cat, “if you only walk long enough.”

Alice’s Adventures in Wonderland

The previous chapter explained the COLNAV organization and the context in which the outsourcing of flight services was conceived. This chapter will analyze the current relationship between the Colombian government and *Vertical de Aviacion* from a managerial perspective.

There are many models to evaluate and classify a business relationship between two or more parties. The authors of these theories studied commercial relationships in a traditional business environment, omitting the particular characteristics that constitute a country’s defense sector. Therefore, in order to have a contextualized analysis of a business relationship where the objective is to provide a nation’s military forces with a core competency, additional factors besides the economical, should be considered.

A country’s security and internal order are good examples of these additional variables, giving a special shape to a business relationship like the one between COLNAV and *Vertical de Aviacion*. An economic value that represents a country’s sovereignty cannot be calculated: the life of all of its citizens is its worth. Therefore, COLNAV will keep outsourcing flight services—one of the

Colombian pillars of internal order—until it develops the internal capacity to provide its troops with air support, despite the costs involved in the agreement.

COLNAV's high dependency on the outsourced service, however, does not have to constitute a disadvantageous agreement with its supplier. In order to achieve a stronger, better position, it is mandatory for COLNAV to first understand the actual relationship and thus identify the weaknesses and potential opportunities for COLNAV, and then to model a bargaining process in which the service can make the most of the relationship and use it to project the development of its own core competencies.

A. STRUCTURAL CONCEPTS

1. Core Competencies

Michael Porter's definition of a firm's competitive advantage, "... [its talent to produce at] lower costs than its rivals or its ability to differentiate and command a premium price that exceeds the extra cost of doing so...",²⁵ describes a corporation's core competency in a globalized world, and thus its ability to sustain a competitive advantage. Such corporations tend to rely on the capacity of the individuals at the firm's strategic apex to identify and integrate other companies' core competencies into one final and complex product (or service) providing what is required—according to Jay Barney²⁶—to implement a "...value creating strategy not simultaneously being implemented by any current or potential competitors and... unable to be duplicated..."

Citing Prahalad and Hamel, "...at least three tests can be applied to identify core competencies in a company. First, a core competency provides potential access to a wide variety of markets... second, a core competency

²⁵ Michael E. Porter, "Towards a Dynamic Theory of Strategy," *Strategic Management Journal*, Vol. 12, Special Issue: Fundamental Research Issues in Strategy and Economics, (Winter, 1991).

²⁶ Jay Barney, "Firm Resources and Sustained Competitive Advantage" *Journal of Management*, Vol. 17, No. 1, 1991.

should make a significant contribution to the perceived customer benefits of the end product... finally, a core competency should be difficult for competitors to imitate. And it will be difficult if it is a complex harmonization of individual technologies and production skills..."²⁷

Complementing this definition with Quinn and Hilmer's "*Essence of Core Competencies*,"²⁸ core competencies consist of "...skill or knowledge sets, not products or functions..." meaning that a firm's strategic apex should focus on the intellectual skills or management systems that actually create a sustained competitive advantage.

As deduced from the previous statements, COLNAV's core competencies are those capacities and skills that constitute the essence of the institution and in which the achievement of its missions are supported. A number of them are intangible, such as leadership, commitment, and the moral standards of its members, for example, but others are tangible and measurable, like the capacity to exert presence and control over jurisdictional waters, or to deploy forces to any part of the national territory as a representative of the state's authority.

Even though COLMIL is not facing competition for a particular market or customer, as is the case in a business environment, its final product—security and internal order—should be perceived by the citizens as an inimitable service by any other organization, a *sine qua non* condition to assure the state's integrity and authority over its territorial domains.

From an operational perspective, the means to implement its core competencies is what differentiates the state's legitimate forces from subversion. Therefore, a successful military organization needs to efficiently integrate the available technology with its members' abilities and training in order to pose a

²⁷ C. K. Prahalad and Gary Hamel, "*The Core Competence of the Corporation*," Harvard Business Review, May-June, 1990, 79-91.

²⁸ James Brian Quinn and Frederick G. Hilmer, "*Strategic Outsourcing*," Sloan Management Review, Summer 1994, 43-55.

credible deterrence to its potential “competitors,” and thus guarantee internal order and the submission of its citizens to the authority of the state.

Air support is one of several differentiating activities positioning COLNAV in its context. It provides the troops with the capacity to exert an opportune and effective presence wherever they are required, thus, enabling the institution to develop a “sustained competitive advantage” over its competitors. Therefore, such a “product” should be the result of an in-house capacity, instead of an outsourcing contract. Citing Hays and Pisano, “...the items or services that should be made or conducted in-house are those that require capabilities that are closely linked with the core competencies and are mutually reinforcing, as opposed to those that can be separated. This is the fundamental strategic consideration that guides the original make-or-buy decisions that ultimately shape the character of the firm...”²⁹

2. Buyer – Supplier Relationships

According to Burt, Dobler and Starling,³⁰ there are three types of buyer-supplier relationships having a number of activities and attributes specific to each one: (1) Transactional, (2) Collaborative, and (3) Alliance.

Transactional relationships are characterized by the fact that neither party is especially interested in the well-being of the other: what one actor wins, the other loses. This type of agreement reduces the possibilities of communication between the parties and demands a considerable amount of time and energy to monitor the proper delivery and quality of the outsourced good or service. It can also be inflexible when flexibility is required, and transactional suppliers tend to provide the minimum service required.

²⁹ Robert B. Hays and Gary Pisano, “*Beyond World Class: The New Manufacturing Strategy*,” Harvard Business Review, January/February 1994, vol 72/1, 77-87.

³⁰ David N. Burt et al., “*World Class Supply Management, The Key to Supply Chain Management*,” 7th Ed., McGraw-Hill – Irwin, Boston, 2003.

Collaborative and Alliance relationships differ from transactional in both interdependence and cooperation between parties, reducing the risks of supply disruptions, lowering costs, and increasing the products/services quality. These types of relationships demand a complex web of formal and informal interconnections, information systems, and specific structures, to enhance learning, which results in long-term agreements between the parties.

Burt, Dobler and Starling³¹ propose a number of key questions to determine what kind of relationship is more appropriate for a particular organization. So far, it is clear that COLNAV–*Vertical de Aviacion* is a typical transactional relationship; however, by answering the following questionnaire, the appropriate relationship for COLNAV with an outsourced flight services company can be determined.

1. Are there many relatively undifferentiated suppliers providing what amounts to interchangeable commodities? Chapter II proved that *Vertical de Aviacion* is the country's only company offering the required service. A transactional relationship is not recommended under these circumstances.

2. Does the supplier possess economic power that it is willing to use over its customers? This is not the case, since the customer is the Colombian government and is not affected by a company's economic power. However, there are means other than economic that the supplier is currently using to exert pressure over COLNAV. The authors recommend a collaborative relationship in this case.

3. Are some suppliers strategic to your business? In other words, do they have a major impact in your competitive advantage³² in the marketplace? Are you highly reliant on them to provide a unique product, technology, or service? If so, an alliance may be vital.

³¹ David N. Burt et al, "*World Class Supply Management, The Key to Supply Chain Management*," 7th Ed., McGraw-Hill – Irwin, Boston, 2003, p. 86.

³² As it was stated previously, COLNAV is highly reliant on flight support to achieve a sustained competitive advantage over its competitors.

4. Would COLNAV benefit greatly if *Vertical de Aviacion* were more integrally connected with the institution, perhaps with their engineers working side by side with the militaries, or locating their maintenance facilities next to the military installations? This is a very important issue for COLNAV, since the first and most practical step to begin a process of in-sourcing the flight services is by learning how to operate the equipment. For this reason, an alliance might be considered.

In conclusion, COLNAV would receive a better service by implementing an alliance with *Vertical de Aviacion*. A collaborative relationship might be a good first step for this purpose. However, as it will be observed in the following paragraphs, the outsourcing company will need powerful reasons to consider a relationship, other than transactional, with COLNAV.

3. Supplier Supremacy

According to Lonsdale, "...The significance of asset specificity for outsourcing is that if activities that require 'transaction-specific investments' are outsourced, the firm will find itself locked into its supplier, as it will not want to write off those investments by revisiting the market. This lock-in can be exploited by the supplier, by renegotiating the terms of the contract or insisting on different terms next time around. This post-contractual lock-in (dependency) will cause the power relation between the two parties to change – the situation can become one of supplier dominance..."³³ Contextualizing this definition, COLNAV is in a lock-in situation with *Vertical de Aviacion* because, even though there are not transaction-specific investments involved in the outsourcing agreement, in the economic terms that the author considers them, the troops are already trained– and used–to operate with the particular type of aircraft offered by *Vertical de Aviacion*. A change of equipment, if available, would generate a new training

³³ Chris Lonsdale, "Locked In to Supplier Dominance: On the Dangers of Assets Specificity for the Outsourcing Decision," *The Journal of Supply Chain Management*, May, 2001.

process for the troops, and an initial reduction of readiness and operational effectiveness that would not be supportable by COLNAV.

4. Strategic Vulnerabilities

Michael Porter states, "...when you outsource something, you tend to make it more generic, you tend to lose control over it. You tend to pass a lot ...to your suppliers. That creates *strategic vulnerabilities* and also tends to commoditize your product..."³⁴ The most relevant disadvantage of outsourcing is the highly dependent relationship that the firm establishes with one supplier. This condition may engender two undesired outcomes, one external and the other internal to the firm: (1) real problems can occur when the single supplier deviates from the company's main objectives, what a number of authors call "loss of alignment," generating a protracted process to search for a new supplier that meets the COLNAV priorities, or even worse, resigning to them in the absence of another source, and (2) by outsourcing a key service, COLNAV may lose its own strategic flexibility to introduce new tactics when it wants, rather than when the supplier permits a change.

B. DIAGNOSING THE CASE

Peter Kraljic, director of a consulting firm based in Germany, developed a model to help companies guard against supply disruptions, cope with the threats posed by a permanently changing environment, and seize the opportunities residing in a company's actual agreements. In his article, published by Harvard Business Review,³⁵ Kraljic cites a number of examples in which world-class companies developed unexpected approaches to cope with uncertainties and supply or price disruptions. Instead of simply monitoring their contexts, the author suggests that managers must "...make things happens to [their] own

³⁴ Michael Porter quoted in Burt et al. Emphasis added.

³⁵ Peter Kraljic, "*Purchasing Must Become Supply Management. How Managers Can Guard Against Material Disruption by Formulating a Supply Strategy*," Harvard Business Review, September-October, 1983, 107-117.

advantage...”³⁶ He concludes that a total change from an operational to a strategic perspective is a mandatory condition for future successes. Companies, therefore, need to replace purchasing processes by supply chain management in order to ensure the long-term availability of critical materials and services.

Kraljic states that a company’s supply strategy must be determined by two variables: (1) the strategic importance of purchasing in terms of the value added and their impact in profitability, and (2) the complexity of the supply market gauged by supply scarcity, availability of substitutes, entry barriers, logistics cost or complexity, and monopoly or oligopoly conditions. A proper analysis of these variables will provide an organization’s top management with arguments to define the supply strategy needed to exploit its purchasing power and reduce associated risks. New opportunities and/or serious vulnerabilities might be exposed as a result of this process.

Figure 4 is developed from Kraljic’s “Stages of Purchasing Sophistication,”³⁷ adjusting his concepts to COLNAV’s context. According to this matrix, COLNAV is facing conditions that demand a Supply Management strategy since both the importance of outsourcing and the complexity of the supply market are high. This is evident by the fact that flight service is a strategic item for COLNAV, which is provided by a pseudo-monopoly supported by strong entry barriers, eliminating any possibility of a substitute.

Once the required type of strategy is defined, Kraljic offers the following steps to implement it: “...the company first classifies all its purchased materials or components in terms of profit impact and supply risk. Next, it analyzes the supply markets for these materials. Then, it determines its overall strategic supply position. Finally, it develops material strategies and action plans...”³⁸

³⁶ Kraljic, 110.

³⁷ Ibid., 111.

³⁸ Ibid., 112.

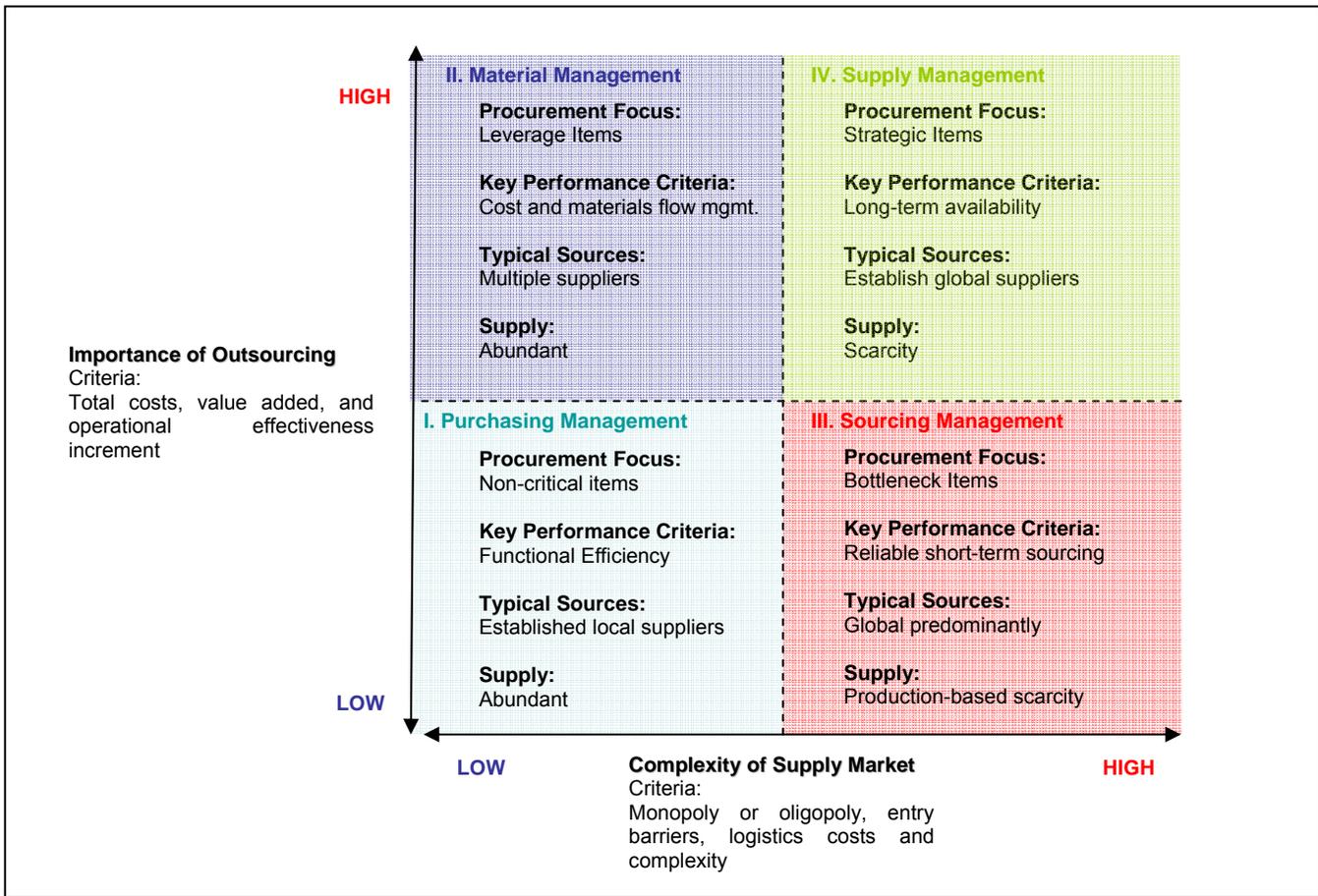


Figure 4. COLNAV Stages of Outsourcing Sophistication

After Peter Kraljic, "Purchasing Must Become Supply Management," Harvard Business Review, Sept-Oct/83

Contextualizing this model, COLNAV should first classify the outsourced service in terms of the value that it represents for the organization's accomplishment of mission and the level of supply risk. Then, it must analyze the supply markets and the overall strategic supply position to define improved outsourcing strategies and action plans.

1. Phase 1: Classification

The value of the outsourced services can be defined in terms of the impact that not having them would generate in the process of mission-

accomplishment. Supply risk is “...assessed in terms of availability, number of suppliers, competitive demand...and substitution possibilities...”³⁹ Using this criteria, COLNAV can classify the items outsourced or purchased into four categories according to their strategic value for mission accomplishment. These categories are: (1) Strategic – high mission accomplishment value / high supply risk, (2) Bottleneck – low mission accomplishment value / high supply risk, (3) Leverage - high mission accomplishment value / low supply risk, and (4) Non-critical – low mission accomplishment value / low supply risk. Each condition demands a specific approach with an increasing complexity as the strategic implications arise.

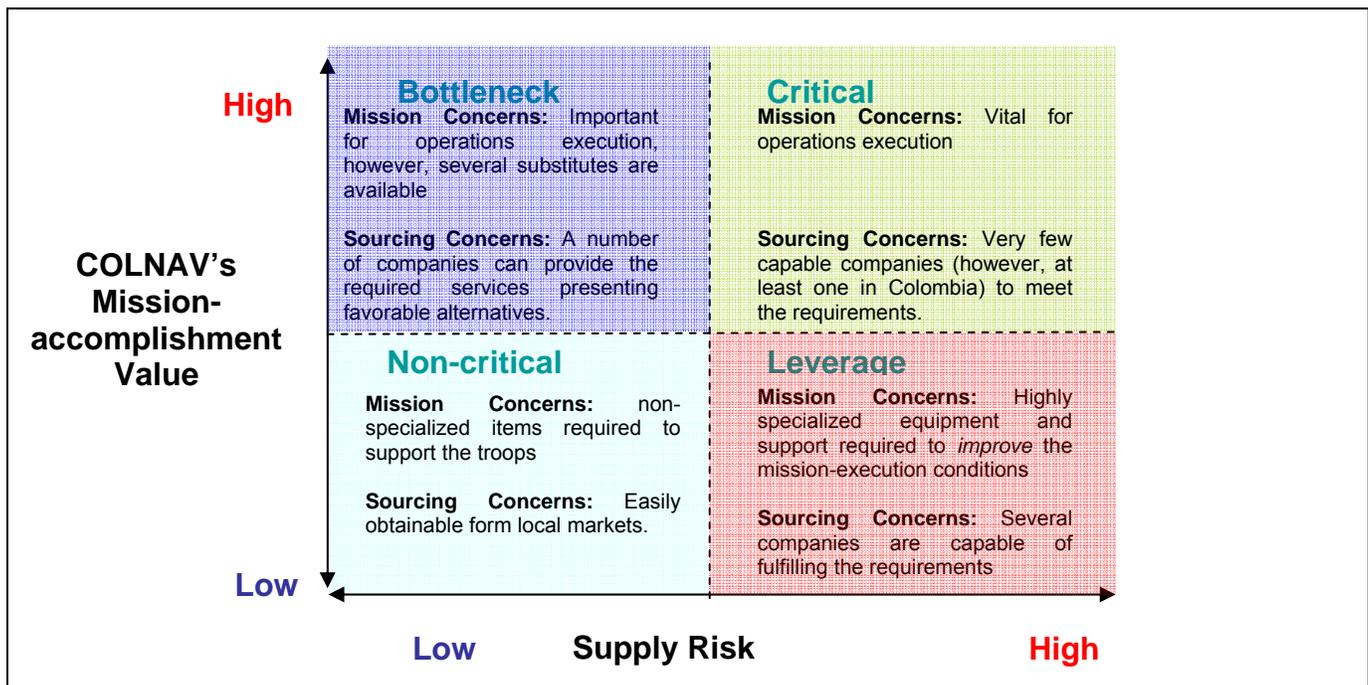


Figure 5. COLNAV – Vertical de Aviation Relationship Classification

After Peter Kraljic, “Purchasing Must Become Supply Management,” Harvard Business Review, Sept-Oct/83.

³⁹ Kraljic, 112.

Figure 5 shows a graphic interpretation of the classification matrix contextualized for the COLNAV- *Vertical de Aviacion* relationship. Considering the air support's relevance for COLNAV's mission, and the fact that only one company in the country can provide the troops with the demanded service, aggravated by the restrictions imposed by the Aerocivil's laws protecting domestic companies, the COLNAV- *Vertical de Aviacion* relationship is defined as Critical.

2. Phase 2: Market Analysis

In this phase, the model weights the bargaining power of *Vertical de Aviacion* against COLNAV's strengths as a customer. This is obtained through a systematic review of the market and an analysis of COLNAV's needs and supply lines in order to gauge its ability to get the kind of supply terms it wants. Extracted from the original model, the criteria applicable to the COLNAV- *Vertical de Aviacion* issues are related in Table 2.

Outsourcing Portfolio Evaluation Criteria		
VA Strengths	COLNAV Strengths	
1	<p>Market Size versus Supplier Capacity VA has a relatively strong position in the Colombian sector of non-regular air transportation. According to Aerocivil,⁴⁰ 48% of the non-regular passengers during 2004 were transported by <i>Vertical de Aviacion</i>. There are 14 MI-17 currently operating for the company, the country's biggest fleet of this type.</p>	<p>Outsourcing Relative Size versus Capacity of Main Units. The number of aircrafts involved in the COLNAV-<i>Vertical de Aviacion</i> contract represents approximately 18% of the total aircrafts of this type for the supplier. Therefore, COLNAV is not in a relatively strong bargaining position with <i>Vertical de Aviacion</i>, according to the outsource size.</p>
2	<p>Cost and Price Structure <i>Vertical de Aviacion</i> was the first company in the world offering passenger and load transportation using Russian equipment,⁴¹ Nowadays they have integrated repair and maintenance shops for aircrafts and components, reducing their cost and price structure.</p>	<p>Cost and Price Structure COLNAV's helicopter fleet is integrated by U.S. and European-made aircrafts. The organization does not have the personnel or facilities to operate and maintain this type of equipment.</p>
3	<p>Break-even Stability <i>Vertical de Aviacion</i> commits 17.85%⁴² of its MI-17 fleet to fulfill the contractual obligations with COLNAV. Therefore, <i>Vertical de Aviacion</i> can provide its service at lower cost than its closest competitor in the country; however, this fact also defines the supplier as a proven tougher bargainer, for it can more easily delay negotiations and accept capacity underutilization.</p>	<p>Cost of non-delivery Cost of non-delivery cannot be stated in financial terms by the buyer; therefore, due to the sensitivity of the required service, costs in terms of mission success are not bearable by COLNAV.</p>
4	<p>Entry Barriers (Capital and Know-how Requirements) There are high entry barriers for new competitors in the Colombian commercial-aviation sector. The elevated costs derived from obtaining the operating licenses, added to the fact that there are no un-filled gaps in the non-regular air transportation market, deter new companies from entering the business.</p>	<p>Entry Costs for New Sources versus Cost for Own Production Assuming that new sources are not likely to be available in the short run is a strong argument to support the need for insourcing the troops' air transportation in the near future. However, economic factors reduce any possibility of insourcing the required flight support.</p>

Table 2. Outsourcing Portfolio Evaluation Criteria

After Peter Kraljic, "*Purchasing Must Become Supply Management*," Harvard Business Review, Sept-Oct/83.

⁴⁰ "Boletín Trimestral Empresas de Transporte Aéreo No Regular, Trabajos Aéreos Especiales y Actividades Conexas" (Quarterly Report of Non-Regular Air Transportation Companies, Special Air Works, and Related Activities) October- December, 2004, available at: <http://www.aerocivil.gov.co/Estadisticas/trimestral/oct-dic04> , downloaded 06/10/07.

⁴¹ *Vertical de Aviacion*, Company Information, available at: <http://www.verticaldeaviacion.com/> , downloaded 06/10/07.

⁴² According to the company's web-site, *Vertical de Aviacion* has 14 MI-17 helicopters currently under operation; 2 of them are permanently deployed in a naval base and they should also have another helicopter available for operational emergencies. Therefore, the break-even factor was calculated by dividing the total number of aircrafts by 2.5 (2 currently under deployment and 1 partially committed).

3. Phase 3: Strategic Positioning

During this phase, the outsourced company⁴³ identifies areas of opportunity or vulnerability, assesses supply risks, and derives basic strategic thrusts for these items from an Outsourcing Portfolio Matrix. Quoting Kraljic again:

The cells in the [Outsourcing] Portfolio Matrix correspond to three basic risk categories, each associated with a different strategic thrust. On items where the company plays a dominant market role and suppliers' strength is rated medium or low, a reasonably aggressive strategy ('exploit') is indicated. Because the supply risk is slight, the company has a better chance of achieving a positive profit contribution through favorable pricing and contract agreements... [when] suppliers are strong, the company must go on the defensive and start looking for....new suppliers...[O]n the other hand, undue aggressiveness could damage supplier relations and lead to retaliation. In this case, a company should pursue a well-balanced intermediate strategy ('balance')....usually, a company will find itself in different roles with respect to different items and suppliers. When it can bargain from a position of strength, it should press for preferential treatment. Bargaining from weakness, the company may have to offer inducements...in order to ensure an adequate supply...⁴⁴

⁴³ In this context, "the company" refers to the role played by COLNAV in the outsourcing agreement.

⁴⁴ P. Kraljic, p. 114, emphasis added.

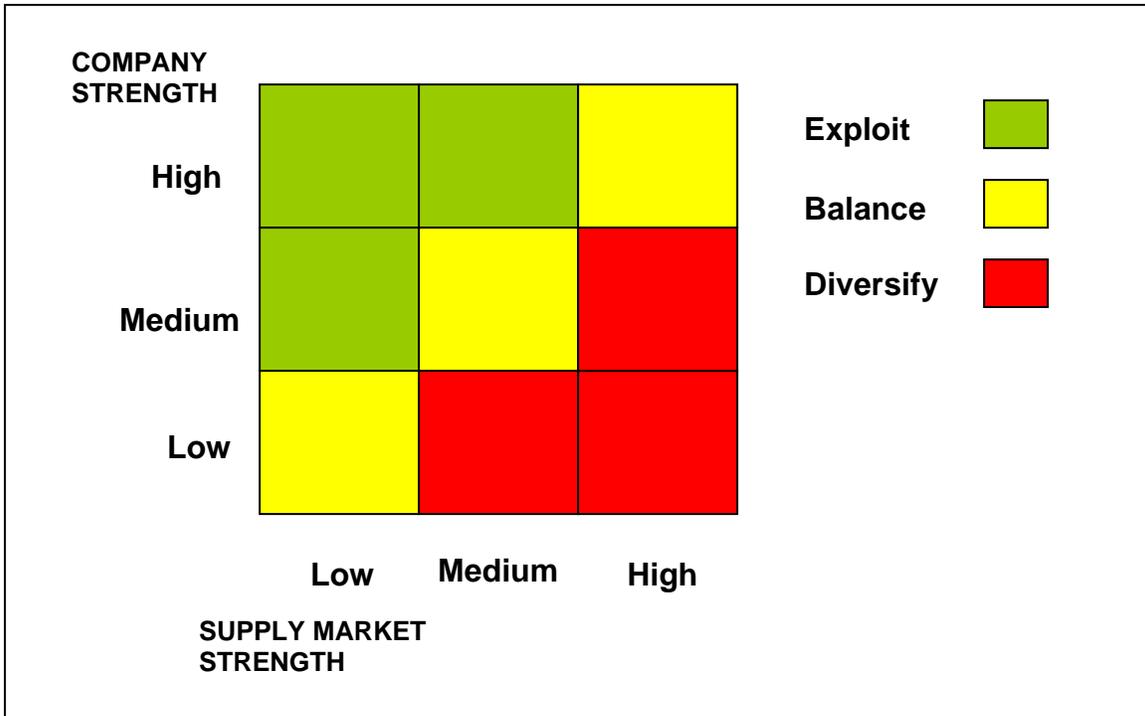


Table 3. Outsourcing Portfolio Matrix

From Peter Kraljic, *“Purchasing Must Become Supply Management,”* Harvard Business Review, Sept-Oct/83.

The COLNAV-*Vertical de Aviacion* agreement is positioned in the bottom-left corner of the outsourcing portfolio matrix due to COLNAV’s reduced strength in a restricted supply market; therefore, the recommended action is to diversify. In order to achieve this goal, COLNAV needs to increase spending on market research or consider developing an in-house capability through backward integration. The fact is that COLNAV has an urgent need of supply options

4. Phase 4: Action Plans

COLNAV is in a situation in which the supplier’s strengths outweigh the company’s strengths, therefore, it should follow the course of action (probably the

only one with real benefits) recommended to reduce the long-term risk of dependence on a single source: achieve the in-house capability of massive troop transportation and logistical support.

Considering budgetary constraints, capacity problems, and limitations, the only alternative available to COLNAV is to continue outsourcing, but under a carefully crafted and managed contract. In the following chapter, a hypothetical negotiation process will be modeled, using a game theory approach, that presents COLNAV with an option to improve its current position in the relationship.

C. THE DANGERS OF OUTSOURCING

Paraphrasing Burt, Dobler, and Starling, there are a number of dangers associated with strategic outsourcing including COLNAV's loss of control and skills that are a direct result of entrusting an important capacity to an external provider. An important amount of information required for future growth will not be communicated from the supplier as a consequence of inadequate contract management.

Another important situation affecting COLNAV is the loss of strategic focus since the goals and objectives of *Vertical de Aviacion* may differ from COLNAV's purposes, reducing operational results and effectiveness.

Finally, there are major concerns related to the release of tactical, operational, and strategic information to a private company, without effective means to prevent intentional or unintentional disclosure of sensitive data.

D. CONCLUSION

Flight Support is an activity providing a sustained competitive advantage that COLNAV needs to accomplish its constitutional mission: it is a *sine qua non* condition for a number of COLNAV core competencies to be considered as such. Therefore, flight services should be the result of an internal capacity rather than

an outsourcing process. However, due to budgetary constraints and other limitations previously stated, COLNAV is forced to provide its troops with air mobility and support by means of external sources.

From an analysis of the buyer-supplier relationship, it was proven that COLNAV is in urgent need of alternative suppliers of air support. Not having such an option available in the near future, due to well-built entry-barriers for new companies, leaves COLNAV with only one path to follow: improving its current position with *Vertical de Aviacion*. The first step toward achieving this is by revisiting the terms of the contract with its counterpart and seeking to obtain convenient conditions in which cooperation, flexibility, and knowledge-transfer occur. The following chapter aims to reach this goal by presenting a game theory approach to a hypothetical process of negotiation between COLNAV and *Vertical de Aviacion*.

IV. MODELING THE COLNAV'S OUTSOURCING OF CORE COMPETENCIES: A GAME THEORY APPROACH

Opportunity is missed by most people because it is dressed in overalls and looks like work.

— Thomas A. Edison

COLNAV, surrounded by unbearable economic and legal obstacles, has only one course of action to achieve control and autonomy over the troops' air support: conceive an innovative approach to a negotiation process with *Vertical de Aviacion* to obtain benefits other than just service. This would be in an effort to build the required human and/or material support structure required to create and develop the internal capacities necessary to operate heavy helicopters.

Without additional funds, there is no immediate solution for the situation affecting COLNAV in regards to massive air support. However, just like the most important values in life, such as happiness, self-esteem, and self-fulfillment, the best results for COLNAV can be achieved as a result of a delayed and indirect approach, a by-product of other activities. This chapter will show it.

A. THE RATIONAL ACTOR

Graham Allison and Phillip Zelikow, authors of one of the most influential books on foreign relationships, "*Essence of Decision: Explaining the Cuban Missile Crisis*," provide the behavioral basis that will be assumed for COLNAV and *Vertical de Aviacion* in the negotiation process analyzed in this chapter.

The Rational Actor Model, as devised by Allison and Zelikow, is characterized by the fact that it seeks to explain an action (a behavior that reflects a purpose or an intention). To do so, it defines parties as rational actors who execute actions as a result of a calculated solution to a particular problem.

The option selected by each party can be explained (and understood) by presenting the goal that it is pursuing as well as available alternatives, showing that the one selected is the most reasonable choice (or value-maximizing), for its proposed objectives.⁴⁵

The process that a decision-maker has to track has the following steps: 1. determination of goals and objectives, 2. alternatives, 3. consequences, and 4. choices. Those are interdependent variables, meaning that in order to make his decision, the leader must properly evaluate them and consider the causes and effects prior to selecting the most convenient option.

According to Robert Jervis, processes cannot be understood by summing up the characteristics of the parts or the bilateral interactions between pairs of them.⁴⁶ Moreover, actions often interact and produce results that cannot be comprehended by linear models, which is the most common type of relationship between inputs and outputs. Therefore, what must be taken into consideration during the COLNAV-*Vertical de Aviacion* negotiation process is that a small amount of change in a variable can produce a disproportionate result at one end of its range.

COLNAV, performing as a rational actor, will seek to improve the current position against its counterpart by modifying specific and perhaps, imperceptible, conditions of the agreement in order to produce dramatic and positive results. These outcomes might not be available immediately but, as Jervis states, “many crucial effects are delayed and indirect...indirect effects may be more important than direct ones.”⁴⁷ Moreover, a direct approach is not an option for COLNAV since it is negotiating from a weak position; its goal, therefore, will be achieved in the form of a by-product resulting from a different action.

⁴⁵ Graham Allison and Phillip Zelikow, *Essence of decision: Explaining the Cuban Missile Crisis*, 2nd Ed., Longman, New York, 1999.

⁴⁶ Robert Jervis, *System Effects, Complexity in Political and Social Life*, Princeton University Press, Princeton, New Jersey, 1997.

⁴⁷ *Ibid.*, p. 29.

B. DEFINITIONS

1. Partial Conflicts

Paraphrasing Phillip Straffin,⁴⁸ Game Theory uses mathematical tools to study situations involving both conflict and cooperation. The players in a game choose from a list of available courses of action in order to define their *strategies*. Such decisions give form to the game's *outcomes*. The players have *preferences for the outcomes*, meaning that they like some more than others.

Partial-conflicts or non-zero-sum games involve situations in which the interests of players are not strictly opposed, and not strictly coincident. The game combines competitive aspects with some opportunities for cooperation, and is solved in accordance with assumptions made about how the players can communicate with each other.

There are three different approaches to solving a non-zero-sum game based on the interactions between players: with or without communications, and through a Nash Arbitration. The latter will be implemented in the COLNAV-VA negotiation process.

2. Nash Arbitration

One method for solving cooperative, partial-conflicts when two players have a number of outcomes available and presented in such a way that they cannot concur on a solution but are willing to call an impartial outside arbitrator, and sit down together to decide what is a reasonable or fair outcome to the game, and then agree to implement that outcome, is called *Nash Arbitration*.⁴⁹ John Nash, father of the arbitration scheme, demonstrated that, if the involved parties failed to agree on a solution, they would get a default outcome

⁴⁸ Phillip D. Straffin, *Game Theory and Strategy*, The Mathematical Association of America, New York, 1975.

⁴⁹ *Ibid.*, 105.

representing a status-quo point (SQ) in a convex polygon resulting from the collection of outcomes in a coordinate plane.

The SQ represents the outcome for each party without having to cooperate with its counterpart, a security level from which negotiations begin, and therefore no player would accept an outcome below this value.

The Nash Arbitration Model proposes a method to produce a solution in a convex polygon with an SQ in it, providing the confronting parties with an optimal and fair outcome. In order to implement this arbitration scheme, four axioms need to be true:

1. Rationality: The solution point should be in the negotiation set.
2. Linear Invariance: If either player's utilities are transformed by a positive linear function, the solution point should be transformed by the same function.
3. Symmetry: If the polygon happens to be symmetric about the line of slope +1 through SQ, then the solution point should be in this line.
4. Independent of Irrelevant Alternatives: Irrelevant alternatives cannot change the solution point.

There is only one arbitration scheme which satisfies axioms 1 through 4. It is this: if $SQ = (x_0, y_0)$, then the arbitrated solution point N is the point (x, y) in the polygon with $x \geq x_0$ and $y \geq y_0$, which maximizes the product $(x - x_0)(y - y_0)$.⁵⁰

3. Pareto Optimal Solution

Citing Straffin, "an outcome of a game is considered non-Pareto-optimal if there is another outcome which would give both players higher payoffs, or would give one player the same payoff but the other player a higher payoff. An outcome is *Pareto Optimal* if there is no such other outcome....Pareto principle: to be acceptable as a solution to a game, an outcome should be Pareto Optimal."⁵¹

⁵⁰ Nash Theorem, as quoted in Straffin, 106.

⁵¹ Straffin, 68.

4. Security Level

A player's security level is the value for the game that he can guarantee for himself even if the other player abandons his payoffs and minimizes his opponent's payoffs instead. In this case, it represents the worst that VA can do to the COLNAV and vice versa.

C. THE SCENARIO

The following scenario will be assumed in order to develop the model:

COLNAV, aware that outsourcing one of the activities enabling its core competencies —the air support— reduces its own strategic flexibility to execute military operations in the time and mode that it wants, defines as paramount the necessity for improving its troops' air-support.

Currently limited by legal issues, budgetary restrictions, and a weak relative position facing a sole source of service, the organization must explore alternatives. The first would be to improve its bargaining position against the supplier, and seek to obtain benefits other than just service in order to build the required human and/or material support structure required to create and develop the internal capacities to operate heavy helicopters. The second is to present sturdy arguments at superior decision-making levels supporting the need for the development of an in-house capability that creates the economic relationship under consideration in this paper.

Vertical de Aviacion, on the other hand, owns the country's largest fleet of commercial helicopters, dominating the Colombian market's non-regular air transportation and thus controls the prices of flight-services. Knowing COLNAV's limitations, *Vertical de Aviacion* (VA) would use its strong bargaining position to maintain a *status-quo* with COLNAV, taking advantage of the long-term agreements' benefits with the government.

D. ASSUMPTIONS

Following are the necessary assumptions to develop the game and to understand both player's arguments and objectives.

Both players act rationally, meaning that both are seeking to obtain the best possible outcome.

There are no external pressures or constraints affecting this game. COLNAV's main interest is to improve its bargaining position in order to gain flexibility and set the basis for the development of a near-future capacity of troop transportation, while VA seeks to maintain the status-quo of the current relationship, knowing that as long as COLNAV does not develop an outsourced capacity, it represents a long-term, high profit, controlled agreement.

There are no external changes affecting the player's outcomes i.e. legal constraints remain equal, new sources do not enter the market, the COLNAV keeps demanding the air services, and VA remains the sole source.

E. THE GAME

The purpose of this game is to experiment with different interactions between COLNAV and VA, visualizing strengths and opportunities that allow the former to assume stronger and more beneficial positions with the latter.

COLNAV has two alternatives in this game:

Sign a contract with VA (S)

Do not sign a contract with VA (NS)

VA has two options as well:

Maintain the status-quo (SQ)

Accept modifications to the current terms of contract (NSQ)

The resulting matrix will be as follows:

		VA	
		SQ	NSQ
COLNAV	S	a	b
	NS	c	d

Table 4. COLNAV – VA Matrix of interactions

1. Utilities

Utilities for this game will be calculated on an ordinal basis, meaning that higher numbers represent more preferred outcomes. Since it is difficult to determine the actual utility of each of these rankings for the COLNAV or VA without further research beyond the scope of this thesis, it will be assumed that the ordinal utility of these rankings equals the cardinal utility; that is, four is two times as good as two, three is three times as good as one, etc. Making this assumption is necessary in order to illustrate Nash arbitration; however, in order to use this in practice, the decision makers would have to develop a utility scale placing all outcomes between the best and worst outcomes so that the differences between their choices are meaningful. That is, they must develop an interval scale.

2. COLNAV's Options

Framed by COLNAV's main objective to improve its bargaining position against its supplier in order to obtain benefits other than just service, and to build the required human and material support structure required to create and develop internal capacities to operate heavy helicopters, the following are COLNAV's options as presented in table 4:

Best Option (4): (S, NSQ) COLNAV signs a contract with VA under new terms of cooperation. Basically, COLNAV would introduce, as part of VA's obligations, training flight crews and maintenance personnel to operate this type of aircraft. This option would provide COLNAV with qualified human resources to develop the required internal capacity for the near future.

Second Best Option (3): (NS, SQ) COLNAV does not sign a contract with VA as a consequence of the inability, or lack of willingness, from the supplier to meet the new terms of the contract as stated by COLNAV. This option is considered second best since, at present, COLNAV is not restricted by the Colombian *Aerocivil* to buy services from domestic companies (no one can provide the requested service in the country) and, therefore, is free to go to the international market for better agreements, strengthening its relative position with its supplier, and thus reducing the Supply Risk factor.

Third Option (2): (S, SQ) COLMAR's demands for permanent air support, added to the supplier's strong bargaining position, results in the renewal of the contract under its same initial terms. This situation does not present any favorable position for COLNAV since it is defined as a *Transactional Relationship*.⁵²

Fourth Option (1): (NS, NSQ) Although VA accepts changes, costs are increased and COLNAV cannot afford them. This is the worst-case scenario because COLNAV, would not only be unable to renew the contract, which would leave COLMAR's troops in a vulnerable situation, but it would also have to give up its goals and return to an unfavorable, but economically affordable agreement with VA. However, despite the downsides of this outcome, it would help COLNAV

⁵² According to Burt, Dobler and Starling's "*World Class Supply Management*," this type of buyer-supplier relationship is defined by several characteristics:

- An absence of concern by both parties about the other party's well-being
- Costs, data and forecasts are not shared
- Price is the focus of the relationship

Transactional suppliers tend to provide the minimum service required and are highly inflexible when flexibility is demanded (Burt et al, 82).

to stress at higher levels the imperative necessity of achieving an internal capacity of air transportation for its troops and an inflexible, non-cooperative supplier.

3. VA's Options

Vertical de Aviacion wants to keep the current terms of the contract. By doing so, COLNAV would never be able to develop the internal capacities required to operate heavy helicopters and thus would remain *VA-dependent* to accomplish its mission. Here are its options as presented in table 4:

Best Option (4): (S, SQ) COLNAV renews the contract under the same conditions. The VA retains its strong bargaining position without sharing knowledge with its customer.

Second Option (3):(NS, NSQ) VA yields to COLNAV's demands, however, the flight-hours' cost is increased and COLNAV is not able to assume the marginal increments, so the contract is not signed. COLNAV would have to forgo buying its own aircraft and maintain the current status-quo of the agreement.

Third Option (2): (S, NSQ) COLNAV renews the agreement, but under the terms of a new contract, VA is required to do on-the-job training for COLNAV's crews and maintenance personnel. This contract involves knowledge transference that helps COLNAV build its own capacities in the long run, but still represents a good deal for VA.

Fourth Option (1): (NS, SQ) VA does not accept the new terms proposed by COLNAV, allowing the former to seek options among the international suppliers of flight services and thus reduce its bargaining power in the country.

The ordinal outcomes are introduced to the original matrix, where an arrow-flow diagram is used to present the likely outcome of the game as seen in table 5.

		VA	
		SQ	NSQ
COLNAV	S	(2, 4)	(4, 2)
	NS	(3, 1)	(1, 3)

Table 5. COLNAV – VA Matrix of Interactions with Utilities

F. SOLVING THE GAME

Table 5 can be described as follows:

If COLNAV decides to sign the contract (S), VA would choose to maintain the status-quo of the agreement (SQ) obtaining a higher outcome than if it chose to modify the current terms of contract (NSQ) (outcomes for VA facing COLNAV-S are 4 and 2 for SQ and NSQ, respectively).

However, if VA decides to keep the current status (SQ), COLNAV would migrate from S to NS in search of a better outcome (3 instead of 2).

Again, facing COLNAV's decision not to sign the contract, VA would decide to accept the new terms (and also increment the costs of the contract) in order to improve its outcomes. (This decision will yield a new outcome of 3 instead of 1 for VA).

At this point, it will be assumed that COLNAV would find a way to sign the contract (probably reducing the number of flight hours to compensate for the costs increments), taking advantage of the new concessions offered by VA, in order to increase its outcome from 1 to 4. In this position, the game starts all over again.

The matrix movement diagram shows that there is no equilibrium in pure strategies; therefore, a mixed strategy for both players should be implemented in order to solve the game.

1. COLNAV's Security Level

COLNAV is maximizing its security level's outcomes while VA is trying to minimize COLNAV's security level.

COLNAV's payoffs as used to determine its Security Level are:

		VA			
		SQ	NSQ	Minimax	
COLNAV	S	2	4	2	q
	NS	3	1	1	1 - q
	Maximin	3	4		

Since there is no Saddlepoint, the game would be solved through mixed strategies:

$$\text{COLNAV's Expected Outcome (EC)} = \text{VA SQ} = \text{VA NSQ}$$

$$\text{EC} = 2q + 3(1-q) = 4q + (1-q)$$

$$\text{Then, } q = \frac{1}{2} \text{ and } (1-q) = \frac{1}{2}$$

$$\text{and EC} = 2 * (\frac{1}{2}) + 3 * (\frac{1}{2}) = 2 \frac{1}{2}$$

2. VA's Security Level

VA is maximizing its outcomes while COLNAV is trying to minimize VA's security level.

VA's payoffs used to determine its Security Level are:

		VA		
		SQ	NSQ	Maximin
COLNAV	S	4	2	4
	NS	1	3	3
	Minimax	1	2	
		p	1 - p	

Since there is no Saddlepoint, the matrix would be solved through mixed strategies:

VA's Expected Outcome (EV) = COLNAV S = COLNAV NS

$$EV = 4p + 2(1-p) = p + 3(1-p)$$

$$\text{Then, } p = \frac{1}{4} \text{ and } (1-p) = \frac{3}{4}$$

$$\text{And } EV = 4 * (\frac{1}{4}) + 2 * (\frac{3}{4}) = 2 \frac{1}{2}$$

3. Finding the Nash Point

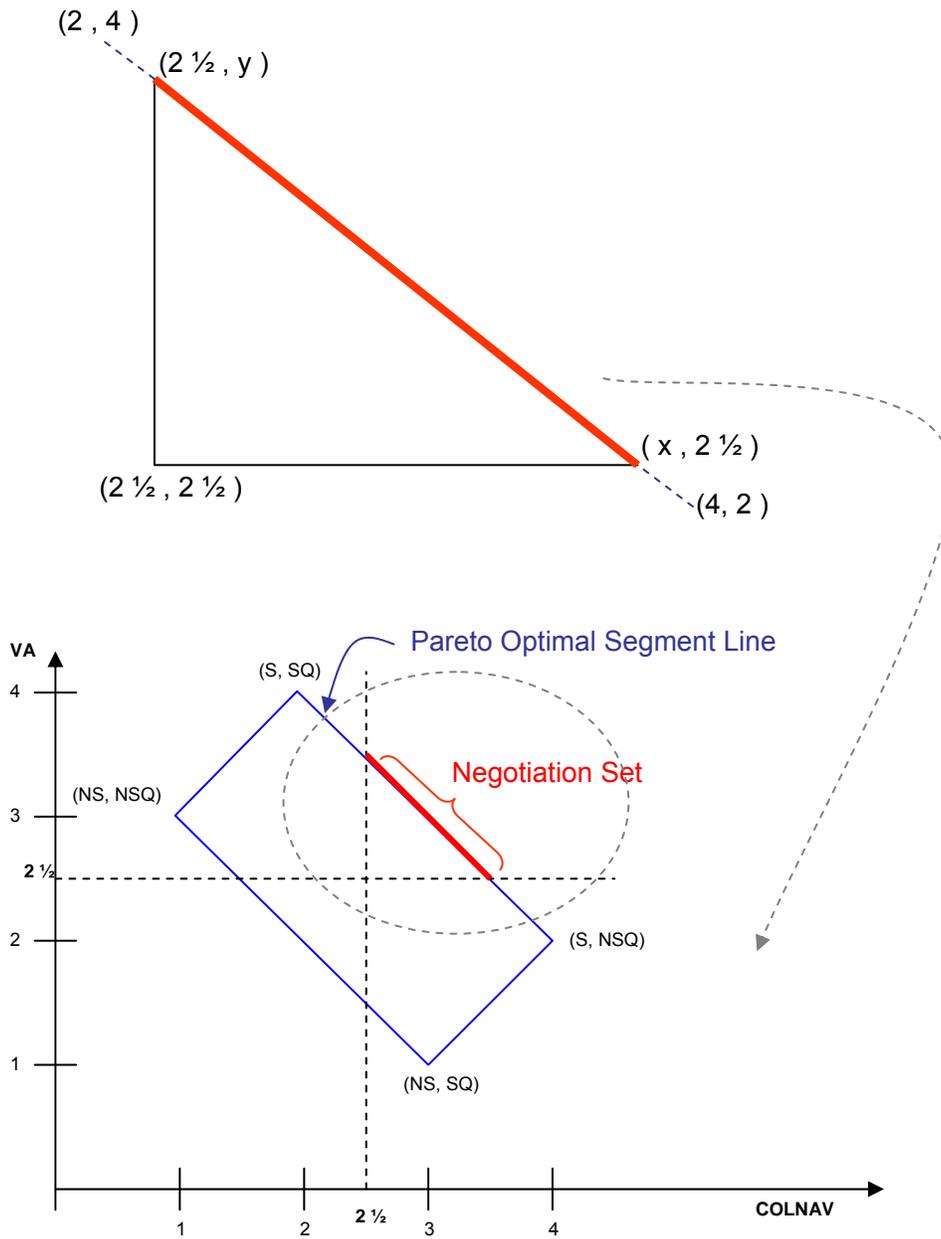


Figure 6. Finding The Nash Point

The Slope (m) for the Pareto Optimal Segment Line is determined by the following equation:

$$m = \Delta y / \Delta x \quad (1)$$

Using the values from (S, SQ) and (S, NSQ) to solve in (1):

$$m = (4 - y) / (2 - 2 \frac{1}{2}) = (4 - 2) / (2 - 4)$$

$$y = 3 \frac{1}{2}$$

Replacing again in (1) in order to solve for x:

$$-1 = (3 \frac{1}{2} - 2 \frac{1}{2}) / (2 \frac{1}{2} - x)$$

$$x = 3 \frac{1}{2}$$

The Nash Arbitration Point is defined by the middle point of the Negotiation Set.

Having calculated the values of x and y, the middle point is (3, 3). This is also the Nash Arbitration Point for this game.

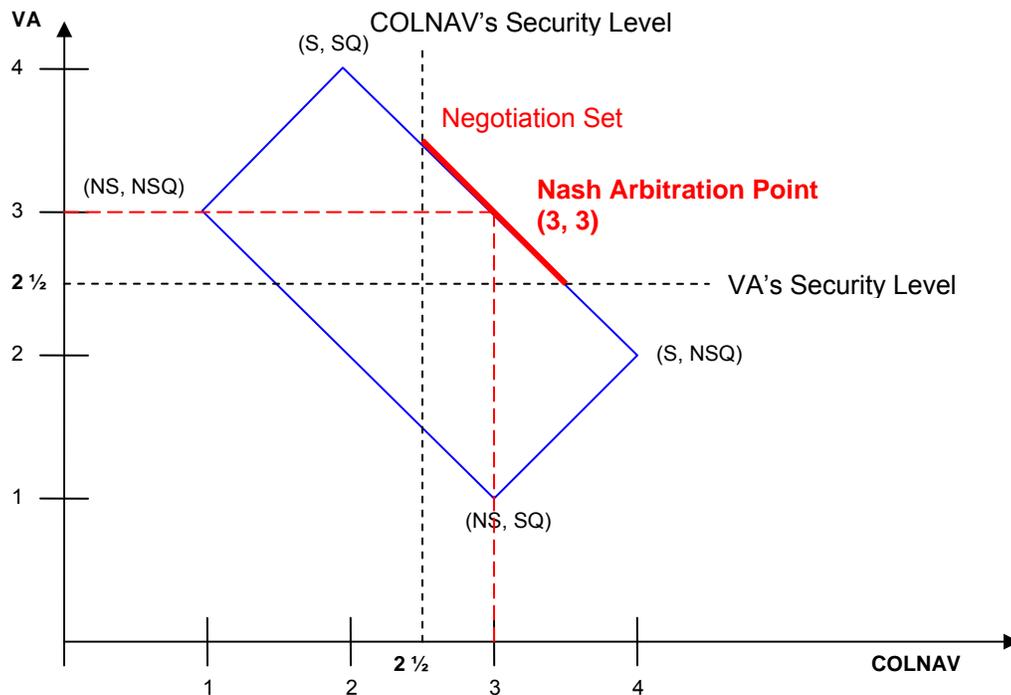


Figure 7. COLNAV – VA Payoff Polygon

Figure 6 shows the payoff polygon for this game, a graphical representation that indicates by its boundaries and interior, all possible combinations of strategies, while its corner-points represent pure strategies. Figure 7 shows the Nash Arbitration Point, the middle point in the segment line providing a fair solution for the game.

G. IMPLEMENTING THE NASH ARBITRATION POINT

Solving by Nash Arbitration, with the player's *Security Levels* as the status-quo point, indicates that both COLNAV and VA should do $\frac{1}{2}$ (S, SQ) + $\frac{1}{2}$ (S, NSQ) in order to obtain the highest payoff for each one.

Considering that signing the contract (S) is a constant in both points of the *Pareto Optimal Segment Line*, COLNAV and VA should focus on negotiating the terms under which the training of crews and maintenance personnel should be provided.

Game Theory provides a consistent course of action through which COLNAV can overcome its current weak position against its sole supplier. The key element to be introduced during the negotiations is to re-define the need to be outsourced; instead of buying flight services, COLNAV needs to purchase flight services *and* knowledge transference to develop its own internal capacities. Such a simple but powerful connotation will produce a dramatic change in the future development of the relationship.

H. CONCLUSION

Up to this point, the outcomes of the negotiation process for COLNAV were represented in the payoff polygon by the corner-point (S, SQ), the best alternative for VA (outcome of 4) and the second worst for COLNAV (outcome of 2), resulting in iterative contracts with VA under unfavorable conditions for the Colombian government.

The game theory model included an apparently minor modification to COLNAV's demands to VA, which made the solution to migrate from a position of no cooperation at all, to an intermediate condition, to which some additional value and knowledge transference is present, and if the antecedents of this agreement are considered, something is better than nothing for COLNAV.

The ultimate goal for COLNAV, the achievement of an internal capacity to massively transport and support its troops, might be attained in a short period as

a consequence of this indirect approach. It is clear that, as was stated before, COLNAV will keep outsourcing flight services until it develops the internal capacity to provide its troops with air support, despite the costs involved in the agreement (p.22). However, results from a different approach to the negotiation process, the second part of this statement—the development of the internal capacity—might become a real asset for COLNAV in the near future. There are two factors supporting this assumption: (1) in a short period, COLNAV would have well-suited personnel to operate heavy helicopters, solving one of the most hindering factors besides the economics, to in-source the required capacity. A reduction in costs derived from purchasing new equipment would act in favor of the COLNAV request for additional funds before the congress, and (2) once the skills and ability to operate and maintain the particular flight equipment become part of the COLNAV spectrum of competencies, the acquisition of new helicopters is more likely to happen as a logical, counter-intuitive, result.

V. CONCLUSION

Our plans miscarry because they have no aim. When a man does not know what harbor he is making for, no wind is the right wind.

Seneca

COLNAV, strongly limited by economic and legal constraints, found a way to provide its troops with flight support in an agreement with a private supplier funded with the operational budget. When it was first conceived, the idea of outsourcing flight services solved an urgent need and, therefore, received approval at different levels of the organization. However, it has been almost five years since then, and what was initially considered as a “life-preserver” for the troops who needed a flexible, rapid response to cope with increasing ONT threats in their jurisdiction, has now turned into a permanent agreement providing COLNAV with nothing but aerial transportation service. This service is provided in terms that the supplier decides is convenient for its interests, which in many cases happen to be in conflict with COLNAV’s, and therefore limit the employment of its resources and initiatives, which are to eliminate the threats of a narco-terrorist organization affecting not only Colombia, but the entire world with its illicit drugs.

The ultimate goal of this document is not to provide a perfect solution to a complex problem that affects an entire organization, but just to highlight the fact that the critical competency of a military branch of the country is being managed with a short-term mindset, a day-by-day approach that will only contribute to aggravate the problem in the long run.

There is an urgent need to change the conditions under which COLNAV is providing support to its members, and it might be as easy as realizing the long-term benefits that will produce an internal capacity of air support and mobility. James Q. Wilson refers to former secretary of defense Robert McNamara’s

actions to describe the adequate public-administration skills required for a leader to succeed in a bureaucratic environment, “[McNamara] believed that the defense budget should not be set on the basis of the political preferences of the president nor the logrolling tendencies of the services but rather on the basis of what it would cost to have the ‘correct’ mix of troops and weapons to achieve the stated goals of defense policy.”⁵³ The decision-makers who succeed are those capable of combining a clear vision of their agencies’ goals with the ability to communicate that vision effectively and motivate the key civil servants to act on it. Wilson calls it “strategic governance”⁵⁴ and that is what is required to transform COLNAV’s spectrum of possibilities to produce real benefits to the organization.

In order to help build a consistent, clear vision, Chapter III presented a managerial analysis of a counterproductive relationship for COLNAV. Good arguments can be extracted from the theoretical framework to support a request for additional funds before the congress, especially the strategic weaknesses generated from a critical, transactional relationship with one source of supply, requiring COLNAV to offer inducements in order to receive the proper service.

In the meantime, in the next negotiation process with *Vertical de Aviacion*, the Game Theory model in Chapter IV might be useful for presenting a good example of the potential large benefits that can be obtained from a minor modification in the terms of the contract. Even though an indirect approach to negotiations could be very important for achieving COLNAV’s goals, a change in attitude is vital for the organization to progress.

It has to become part of the mindset of the entire service that to make the most of its highest-value asset —the people— it is absolutely necessary to wisely invest the scarce economic resources available to accomplish the mission. This concept is applicable not only to this particular scenario, but to the general way of

⁵³ James Q. Wilson, *Bureaucracy, What Government Agencies Do and Why They Do It*, Basic Books, United States of America, 2000.

⁵⁴ Ibid, 213.

doing business in the organization. A sense of urgency is also required in order to produce real changes in the immediate future. That is the only alternative COLNAV has in this context.

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