Prioritizing Tasks in a Peace Mission

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ABSTRACT

This paper examines the use of a statistical model to assist in the ranking of priorities for various "peace mission" tasks in the face of competing mandates (requirements) and limited resources. To this end, the Consensus Decision Support Process (CDSP), a computerized statistical model developed by E. Emond (1987) is used and several experiments are conducted. While the results are promising, further research is suggested for improving the test statistics used as well as relaxing the basic assumptions underlying such models.

INTRODUCTION

Recent years have witnessed a substantial growth and complexity in peacekeeping operations. The complexity of modern peacekeeping operations stems from the multi-dimensionality and multi-disciplinary nature of the crisis. This implies that no single organization or discipline can, by itself, meet (or efficiently perform) all the imperatives of an international intervention in the interests of peace and stability.

The need for co-operation between the various peace mission participants has been recognized, although the success and/or failure of collaboration has always been attributed to the various personalities involved or the conflicting mandates and ethos of the participating organizations. In this paper a statistical model is employed to assist the various participants

prioritize tasks in peace missions to optimally and efficiently allocate human and capital resources. The paper also examines conditions that foster co-operation in theatre. The United Nations Mission in Haiti-UNMIH (with its variants) is used as a case study and various experiments are conducted using participants from this mission.

The remainder of this paper consists of four sections. The various participants in the UNMIH are presented in the first section and the possible coalitions are discussed in the second section. The third section outlines the model and the next section discusses the results. The fourth section concludes the study and suggests future research directions.

UNMIH AND THE PEACEKEEPING PARTNERS

The UNMIH is a unique case in that it is considered a relative "success" and hosted a number of supra-national organizations, the CIVPOL and NGOs. The UNMIH phase was replaced by another mission known as UN Support Mission in Haiti (UNSMIH) with a mandate that includes the assisting in the professionalization of the Haitian police. The final mission in Haiti with a military component was UNTMIH (UN Transition Mission in Haiti).

One of the unique aspects of the Haiti mission was the establishment of a joint mission between a regional organization and the UN. In particular, the international civilian mission in Haiti (known as MICIVIH from the French acronym) was established jointly by the UN and the organization of the American States (OAS). The MICIVIH mandate focused on the monitoring respect for human rights and providing technical co-operation for the reform of the judicial system. At the mid-point of the mission in September 1995, the MICIVIH had 189 members of staff, with 134 human right observers deployed in 12 regional bases (Solomon, 1997).

Name of NGO and Location	Primary Activity	Secondary Activity
AFSC, ADRA (PAP, Central Plateau, CH), CWS	Small Scale Development	
FINCA, Lutheran(Grand Anse), PADF, TP(Sen Rafayel, Ferrier)	Finance Business	
CARE (N.West) CRS, Save the Children	Health General	American Red Cross
DR Intl.	Health Long Term	
Interchurch (NPOs only), INMED (NGOs), DoW(Jacmel) DWB(Saint Marc Hospital)	Health Targeted Group	
World Vision	Health Child sponsorship	
World Concern, US committee UNICEF	Education: General	CWS
World Neighbours	Education Farming	Lutheran, CARE
RED CROSS, Int'l Aid (monetary)	General Aid	
CRWRC, Childreach (PAP, Jacmel)	Self Sufficiency	

OXFAM, POA	Political, Human Rights	Red Cross CRWRC

Table 1: Major NGOs in Haiti by Activity (Source Solomon, 1997).

The NGO activity in Haiti comprises a number of activities including emergency assistance, health care, food distribution and refugee resettlement. NGOs are also involved in economic and social development programs such as community development, micro enterprise, sustainable agriculture programs, advocacy and support for grassroots organizations. As indicated earlier, there are both local and international NGOs working in Haiti.

For the purpose of this study the NGOs are further classified according to their primary and secondary activity. In previous studies regarding NGOs and the Haiti mission it was suggested that there was evidence (albeit weak) of NGO product differentiation and some oligopolistic behaviour (Solomon, 1997). If such is the case then there is a good possibility that some of the NGOs may benefit from collusion. This in turn allows one to find subsets within the peacekeeping partnership that can form a committee and subsequently decide among alternate tasks.

11 major activities were identified as the primary or secondary activity of the 26 NGOs considered here. However, in situations where there were two or more organizations involved in the same primary activity, their area of operation was different (Table 1). In some situations there was evidence of sub-specialization when located in the same environment. For example the Interchurch Medical Assistance and INMED both specialize in the provision of medical supplies. However, INMED sub-specializes in the provision of a supply distribution system to NGOs only, while Interchurch works with non-profit institutions.

CO-OPERATION ISSUES

While the organizations do specialize extensively supporting the product-differentiation hypothesis, it is also evident that some of the general area of specialization lends itself well for forming coalitions. This is important because civil-military and other co-ordination issues in peace theatre tend to be difficult to achieve due to the disjointed mandates of the various peace players. Interviews conducted during the early days of the UNMIH indicated that the Civil-Military Co-ordination Centre (CMOC) was used, at best, as an information outlet than a co-ordination cell. One of the main reasons for this was NGOs showed little interest in attending to a CMOC briefing or meeting sessions.

Fortunately there are cases where the NGOs have to work together under the umbrella of a UN organization as was the case when the UNHCR has the lead role in co-ordinating relief of major refugee movement. Although at the earlier stages of the Haiti mission strict adherence to the mandates of the peace partners was evident and to a large extent required, this had relaxed as the mission evolved. After UNMIH, the subsequent UN missions were less concerned with security and more with democritization, professionalization of the police force, human rights and economic rehabilitation.

This change in focus implied more visibility to NGOs specializing in human rights and economic development and to the UN organizations such as the UNDP and the joint UN-OAS mission MICIVIH. Within this framework the formation of coalition within NGOs and UN orgasnizations become possible and in some instances desirable. Information sessions and interviews with former members of NGOs and military officers of UNMIH, UNSMIH and UNTMIH revealed that co-operation was possible within a subset of the major players as the mission progressed towards a more broader and civilian mandate. In particular, the NGOs that specialized in human rights issues were willing to form coalitions among themselves and co-operate with the UN and MICIVIH officials.

The reasoning for the increased co-operation is fairly intuitive. Human rights issues are given prominence by the donor nations and a UN-OAS sanctioned body (i.e. MICIVIH) channels all activities. NGOs are better off co-ordinating their activities through the MICIVIH since they will have the easy access to the donor governments and can share in the visibility the organization enjoys. Furthermore, the risk of operating independently and subsequently alienating a sanctioned body may be too costly in the long run.

THE MODEL

Multi-attribute methods and game-theoretic approaches are some of the main analytical tools employed by researchers to tackle decision problems. These models and their variants are considered in this study and the advantages and draw-backs are discussed below.

MULTI-ATTRIBUTE MODELS

One of the most popular multi-attribute models is the Analytical Hierarchical Process (AHP) developed by Saaty (1979). This model allows or forces the decision-maker to systematically consider the Options being evaluated through the creation of the attribute hierarchy. For example in prioritizing tasks in a peace mission one has to create a set of attributes and any structure inherent within the tasks being considered. It is possible that a single task will have sub-tasks that have to be independently evaluated by the decision-maker.

Once the tasks and sub-tasks are identified, weights are assigned for each sub-Options. This is done via a pairwise comparison of each sub-option. Finally the derived weights are multiplied by the n-dimensional (in this case n is based on the number of tasks) vector of ratings to produce a scalar value for subsequent ranking purposes.

A number of practical and theoretical problems are obvious for the application of this model to the peacekeeping problem discussed in the previous section. Most of these problems have been cited before by other researchers with specific examples unique to the field of study applied to (Emond, 1987; Brownlow and Watson, 1987). In general the practical and conceptual problems with this method include the addition of extra steps in the decision process, problem of attribute independence and stability of results. In the peacekeeping example the use of the AHP was rejected mainly because the problem of finding consensus is not addressed appropriately in such models. In addition, most members

felt that assigning intensity of like and dislike to tasks and sub-tasks too involved and unintentionally confrontational in a group setting.

From a conceptual point of view, the AHP results are neither consistent nor stable. For example in assigning intensity values between Options A, B and C if A is preferred than B (intensity of 4) and B over C (intensity 2) then logically A is preferred than C with intensity value at 8. In occasions when this does not hold, the AHP is a measure of inconsistency (Emond, 1987). Furthermore, given that different hierarchy can be constructed for the same problem it is possible that there could be more than one logical solution to each problem.

GAME-THEORETIC MODELS

Game-theoretic models are conceptually attractive since such models are based on strategies and winning coalitions. These concepts are inherent in a group setting such as a committee or a variant of a CMOC. However, a typical n-player game theory, the choice of a strategy is linked to a payoff. In a committee type setting the assignment of a payoff function has no obvious logical process.

Recent developments in conflict analysis have shifted the solution concept from optimality to stability. In particular, the solution is not optimizing the payoff for each player but more like Pareto-optimality in the sense that a stable outcome where no player is worse off. Stability in this meta-game analysis has four levels from unstable to rational. The notion of stability and consensus is the most appealing for the problem at hand and is incorporated in the hybrid model discussed below.

CONSENSUS DECISION SUPPORT PROCESS (CDSP)

The peacekeeping problem can be formally stated in the following way. Assume (given the discussion in the previous section) that a subset of the peace partners for various reasons have agreed to sit in a committee to decide among alternative tasks. Specifically there are a given number of equal committee members, say K and a given number of tasks to prioritize, say T. It is assumed a majority is required in order to choose the "winner." It is also assumed that for each member there is a ranked list of the T tasks from most preferred (a rank of 1) to least preferred (the value of T). Each list will contain all T tasks and ties are allowed between two or more tasks.

Implicit in the committee formation is the following assumptions.

1. Equal voice for each member.

2. Adequate knowledge of the Options being prioritized and must rank each Option.

3. Each member subscribes to the common goals of the committee

The Consensus Decision Support Process (CDSP) uses the concepts of stability and dominance in the conflict analysis methodology, to derive a consensus solution (Emond, 1987). Specifically, the CDSP method processes the assessments and determines the strict domination and the possible coalitions for or against each Option given the level of majority required. Once a winning task or Option is selected, it is removed from the rankings and the process continues in an iterative fashion until all tasks or Options are ranked (Emond, 1987).

To further illustrate the CDSP algorithm consider the "preference matrix," the initial focus of the CDSP method, that registers the number of players ranking a task **i** higher than task **j**. If the number of committee members strictly preferring **i** over **j** meets or exceeds the established majority (note that ties are insufficient), then Option **i** is said to dominate Option **j** (Emond, 1987). In situations where all rows in the preference matrix contain at least one value less than the majority, no further winner can be declared using dominance. However, the dominance argument can still be used to remove some clear "non-winners." These are tasks or Options where the row has every value less than the majority and at least one value in the corresponding column is equal to or greater than the majority.

Once dominance methods have been exhausted, the next algorithm analyzes stable outcomes as defined in conflict analysis. Specifically a task is considered a "stable outcome" for a given member, if the member could propose to support a task and a majority of the members support the given task or a majority of the members do not support any other Option that is less favourable to that member. Underlying this definition the following must also hold:

- A member will not propose his/her lowest ranking (rather wait and see).
- Even if the above holds it is not stable if there exists a higher ranking outcome since a member would always support highest ranking stable outcome.

Specific examples with increasing complexities are provided in Emond (1987). In general the dominance and stability algorithms are repeated iteratively until a clear winner emerges or the Option set cannot be further reduced. In the latter case, the tasks are declared as tied winners. The CDSP algorithms have been developed and implemented in PC-based software since the early 1990s. The software package has been applied in numerous committee environments within the Canadian Department of National Defence (DND) including the Army Equipment Board Secretariat. The use of the model in helping the board achieve consensus in prioritizing the Army's capital equipment goals is a good indication of its adaptability to the peacekeeping problem outlined above.

EXPERIMENTS AND RESULTS

The experimental committee was formed using the oligopoly and coalition-forming arguments set out earlier. The members include representatives from MICIVIH, the UN, American Red Cross, OXFAM, Partners of the Americas (POA), Christian Reformed World Relief Committee (CRWRC) CIVPOL (civilian police from various countries under UN) and the Haitian National Police (HNP).

Recall from Table 1 that the NGOs in the committee all work in the Human Rights field while the CIVPOL and the HNP are increasingly visible in the post UNMIH phases and are also directly involved in all matters of security, law and human rights. MICIVIH and the UN as the lead agencies on human rights issues and the overall mandate of the UN are also represented in this committee. The tasks for the committee to prioritize were drawn from the participants and from actual tasks performed during any one of the UN missions in Haiti with a human rights flavour. There were nine tasks identified for the experiments and were generic. These include:

1. Task 1: UN Sponsored task.
2. Task 2: MICIVIH sponsored.
3. Task 3: Red Cross activities.
4. Task 4: NGO project 1.
5. Task 5: NGO project 2.
6. Task 6: NGO project 3.
7. Task 7: Government specific request via HNP.
8. Task 8: Government sponsored project via HNP.
9. Task 9: Citizen requested via CIVPOL.

Each committee member was briefed on the projects and the associated mandate of the overall mission under which the UN operated.

A total of four experiments or trials were conducted. In each trial the committee members were given scenarios that would force different coalitions or resistance for co-operation. The last trial reduces the number of NGOs from four to three leaving the number of Options down to eight and the committee members down one to seven.

TRIAL 1

The first scenario was designed to simulate a typical committee setting with the common goal of prioritizing the various tasks according to importance to the mission. The ranking of each member is presented below.

MICIVIH	9 2 1 4 5 6 3 7 8
UN	1 7 3 2 9 8 5 6 4
RED CROSS	3 9 1 2 6 5 4 8 7
OXFAM	1 4 9 2 3 6 7 5 8
POA	2 5 9 1 3 8 6 4 7
CRWRC	6 1 2 3 9 5 8 4 7
CIVPOL	9 8 7 2 1 6 4 5 3

HNP	7 8 9 1 2 6 3 4 5

Table 2: Trial 1 Ranking by Each Member.

Even without running the CDSP, one can see that Task 9 is ranked in the top three by six of the eight members of the committee. The rankings were inputted in the CDSP computer package and the results are outlined below.

Task Name	Trial 1
Citizen requested via CIVPOL	OPTION 9
UN sponsored task	OPTION 1
MICIVIH Sponsored task 1	OPTION 2
Red Cross activities, NGO Project 3	OPTION 3,6
NGO project 2	OPTION 5
Government sponsored via HNP 2	OPTION 8
NGO project 1	OPTION 4
Government specific via HNP	OPTION 7

Table 3: Trial 1 CDSP Consensus Result of Ranking.

The consensus choice is task 9 or the citizen requested task tabled by CIVPOL. In light of the human rights mandate the committee members adhere to, responding to a citizen's request is ranked higher. Most NGOs according to the interviews conducted after the ranking found the large scale or broad nature of the UN and MICIVIH objectives attractive. In particular, participating with donor recognized agencies bring medium and long-term benefits for the NGOs while in the short-run resource constraints can be relaxed by working with a larger entity. Note also that there is a tie between the Red Cross and NGO project 3. Due to the independent nature of the NGOs and to some extent MICIVIH, supporting a government-sponsored task was obviously ranked low.

Scenario 1	MICIVIH	UN	RED CROSS	OXFAM	POA	CRWRC	CIVPOL	HNP
MICIVIH	1							
UN	-0.06	1						
RED CROSS	0.39	0.22	1					
OXFAM	0.56	0.06	0.39	1				
POA	0.44	0.17	0.39	0.11	1			
CRWRC	0.22	0.17	0.5	0.22	0.33	1		
CIVPOL	0.17	0.11	-0.11	-0.06	0.06	-0.17	1	
HNP	-0.06	0.33	-0.11	-0.06	-0.17	-0.17	0.67	1

Figure 1: Tau B Coefficient Table of Trial 1 (Level of Agreement Between Each Member).

The degree or agreement between the committee members is examined via Kendal's Tau B measure as discussed in Kendal (1990).

As verified in the post-ranking interviews with the participants, there was a general agreement between MICIVIH and the NGOs and between the CIVPOL and HNP and to some extent the UN. The consensus result from the CDSP was found to reject the null hypothesis that the rankings are different from random rankings.

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ALTERNATIVE TRIALS

In subsequent trials, committee members were given a progressively stringent addition to the mandate they were operating under scenario 1. The fourth and last trial reverted back to the old mandates as set out in scenario 1 but with one member dropping out of the committee (CRWRC). In scenario 2 and 3, the rankings remain different from random rankings but the consensus results were not as clear as the first trial for rankings below the top two tasks.

TASK ORDER	**DESCRIPTION OF TASKS**	**Committee Members Ranking Trial 2 and 3 (- indicates a tie)**			**CDSP Result T1**	**CDSP Result T2**	**CDSP Result T3**
			Trial 1	Trial 2			
TASK 1	UN sponsored task	MICIVIH	9 2 1 4 5 6 3 7 8	9 2 1 4- 5- 6 3- 7- 8	TASK 9	TASK 9	TASK 9
TASK 2	MICIVIH Sponsored task	UN	1 7 3 2 9 8 5 6 4	1 7 3 2- 9- 8 5- 6- 4	TASK 1	TASK 1	TASKS 1,2,6
TASK 3	Red Cross activities	RED CROSS	3 9 1 2 6 5 4 8 7	3 9 1- 2- 6 5- 4- 8- 7	TASK 2	TASK 2	TASKS 3,4,5,7,8
TASK 4	NGO project 1	OXFAM	1 4 9 2 3- 6 7-5 8	1 4 9 2 3- 6- 7 5- 8	O 3,6	TASKS 3,4,6	
TASK 5	NGO project 2	POA	2 5 9 1 3- 8 6- 4 7	2 5 9 1- 3- 8 6- 4- 7	TASK 5	TASKS 5,7	
TASK 6	NGO Project 3	CRWRC	6 1 2 3 9- 5 8- 4 7	6 1 2 3- 9-5 8-4 7	TASK 8	TASK 8	
TASK 7	Government specific via HNP 1	CIVPOL	9 8 7 2 1- 6- 4 5- 3	9 8 7 2- 1- 6 4 5-3	TASK 4		
TASK 8	Government sponsored via HNP 2	HNP	7 8 9 1 2- 6 3- 4 -5	7 8 9 1- 2- 6 3- 4- 5	TASK 7		
TASK 9	Citizen requested via CIVPOL						

Table 4: CDSP Committee Rankings of Trials 2 and 3 and Consensus Ranking of Trials 1-3.

Note that as the mandate become stricter, the conditions for coalition become less attractive. The ranking by the committee members show strict adherence to own mandate specific tasks. However, a consensus result was still possible for the top two tasks indicating the existence of some agreement on the overall mandate of the mission. The level of agreement between each member and the CDSP consensus results are illustrated below (Figure 2).

Committee Members	CDSP 1	CDSP 2	CDSP 3
MICIVIH	0.54	0.77	0.8
UN	0.2	0.12	0.08
RED CROSS	0.76	0.65	0.6
OXFAM	0.48	0.79	0.48
POA	0.59	0.33	0.27
CRWRC	0.65	0.42	0.55
CIVPOL	0.14	0.09	0.42
HNP	0.14	0.09	0.27

Figure 2: Correlation Coefficient between the CDSP result and Individual Member's Ranking.

The consensus results show that there is a possibility that the committee was split into two coalitions with the NGOs and MICIVIH in one group and the UN, CIVPOL and the HNP on the other. Further research and modification of the CDSP is required to uncover some of the group behaviour inherent in the decision making.

The last trial has one NGO out of the committee leaving eight tasks to be considered in a seven-member committee. The mandate restrictions were brought back to the conditions set out in Trial 1.

	Description of Tasks	CDSP 4	Committee Members	Ranking by Member	CDSP 4
Task 1	UN sponsored task	Task 8	MICIVIH	8 2 1 4 5 3 6 7	0.71
Task 2	MICIVIH Sponsored task 1	Task 1	UN	1 6 8 2 7 3 5 4	0.36
Task 3	Red Cross activities	Task 2	RED CROSS	3 8 1 2 5 4 7 6	0.57
Task 4	NGO project 1	Task 3	OXFAM	1 4 8 2 3 6 5 7	0.71
Task 5	NGO project 2	Task 4	POA	2 5 8 1 3 7 4 6	0.36
Task 6	Government specific via HNP 1	Task 6	CIVPOL	8 7 6 2 1 4 5 3	0.07
Task 7	Government sponsored via HNP 2	Task 5	HNP	6 7 8 1 2 3 4 5	0.21
Task 8	Citizen requested via CIVPOL	Task 7			

Figure 3: Trial Four Rankings and CDSP Result.

Once again Task 9 (Civilian request via CIVPOL) is the consensus top choice followed by Task 1 and 2 (UN and MICIVIH projects respectively). The CDSP result is closely correlated with the rankings of MICIVIH and the NGOS and somewhat less so with CIVPOL and the HNP. This pattern has remained the same throughout the various trials conducted.

CONCLUSIONS

In this study, the problem of civilian-military co-operation in a peacekeeping mission was examined by focusing on the problem of prioritizing tasks at the operational and tactical levels. To this end, a statistically based decision model, CDSP was employed and a number of trials were simulated. The trials were based on interviews and information sessions with personnel that participated in the various UN missions in Haiti.

The CDSP model is based on the concepts of game theory and conflict analysis and was found to be more appropriate than other decision models such as multi-attribute analysis. The CDSP is based on the assumptions that each member of the committee has an equal voice, each member has knowledge of the Options being prioritized and each member of the committee subscribes to the common goals of that committee.

These assumptions while innocuous for the committee setting, are stringent for the military-civilian co-operation problem due to stringent and disjointed mission mandates of the various peace partners. However, it was shown that various NGOs and supra-national

organizations "compete" in a peacekeeping environment and in some situations, form loose coalitions to reduce resource constraints and to optimize "production". This fact led to the formation of a hypothetical committee to deal with task prioritizations and conduct experiments (trials) to assess the use of CDSP.

The results were in general promising but indicated the need to do further research in refining the output of the CDSP in illuminating the interaction between the various committee members. For example, it is possible to introduce multi criteria decision analysis via a maximized weighted average correlation coefficient solution concept (Emond, 1997). In particular, the weighted average correlation coefficient looks for a solution ranking which gives a higher level of agreement with the input rankings as measured by the average value of the rank correlation.

While this measure avoids the problems associated with a linear mapping of artificial scores in several dimensions, the solution concept is sensitive to the number of objects being ranked (say N=12).

ACKNOWLEDGMENTS

The author wishes to thank all those who contributed to this study. The study was funded and sponsored by the Centre for Studies in Defence Resources Management (CSDRM), Kingston, Canada and the Security and Defence Forum (SDF) grant. Particularly, Mr. Edward Emond of the Directorate of Operational Research, Department of National Defence provided help, and technical advice while the study was being done. The Author also wishes to thank the various people who participated in the trials and simulations who gave freely of their time and answered all questions frankly and completely. The author remains responsible for the shortcomings and omissions that may exist in this study. The contents do not necessarily reflect the views of the Canadian Department of National Defence.

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