

2

AD-A215 766

DECISION MAKING IN CONTINGENCY
OPERATIONS: DIFFERENT CONFLICTS,
DIFFERENT CHALLENGES

A Monograph

by

Major Mark T. Kimmit

Field Artillery

DTIC FILED



DTIC
ELECTE
DEC 20 1989
S B D

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

Second Term 88-89

Approved for Public Release; Distribution is Unlimited

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited	
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		7a. NAME OF MONITORING ORGANIZATION	
6a. NAME OF PERFORMING ORGANIZATION School of Advanced Military Studies, USACGSC	6b. OFFICE SYMBOL (If applicable) ATZL-SWV	7b. ADDRESS (City, State, and ZIP Code)	
6c. ADDRESS (City, State, and ZIP Code) Fort Leavenworth, Kansas 66027-6900		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)	10. SOURCE OF FUNDING NUMBERS	
8c. ADDRESS (City, State, and ZIP Code)		PROGRAM ELEMENT NO.	TASK NO.
			WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) Decision Making in Contingency Operations: Different Conflicts, Different Challenges (U)			
12. PERSONAL AUTHOR(S) Major Mark T. Kimmitt, USA			
13a. TYPE OF REPORT Monograph	13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) 89/05/28	15. PAGE COUNT 46
16. SUPPLEMENTARY NOTATION			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	Contingency Operations Joint and Combined Operations Joint Doctrine Decision Making	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
<p>This monograph deals with decision making in contingency operations. It begins with the observation that contingency operations are the most frequent method by which the United States projects power worldwide. Studying three areas which appear to differentiate contingencies from conventional operations, the author examines if these differences impose unique decision making challenges on leaders.</p> <p>The author uses three case studies as evidence for the research question-- Operation BLUEBAT, the 1958 intervention into Lebanon; POWER PACK, the 1965 intervention into the Dominican Republic and URGENT FURY, the 1983 intervention into Grenada. Through the use of elementary decision analysis and game theory, the differences observed in contingency operations are modeled and explained.</p> <p>The author concludes that differences do exist, and these differences are worthy of study</p>			
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL Major Mark T. Kimmitt		22b. TELEPHONE (Include Area Code) (913) 684-3437	22c. OFFICE SYMBOL ATZL-SWV

**Decision Making in Contingency Operations:
Different Conflicts, Different Challenges**

by

**Major Mark T. Kimmitt
Field Artillery**

**School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas**

1 May 1989

Approved for public release; distribution is unlimited

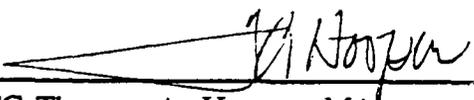
SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

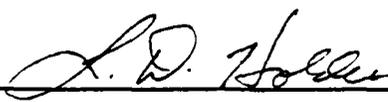
Name of Student: Mark T. Kimmitt, MAJ, Field Artillery

Title of Monograph: Decision Making in Contingency Operations:
Different Conflicts, Different Challenges

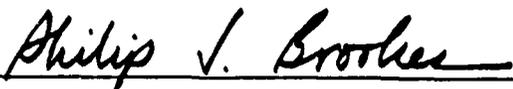
Approved by:



LTC Thomas A. Hooper, MA Monograph Director



COL L. D. Holder, MA Director, School of
Advanced Military
Studies



Philip J. Brookes, Ph.D. Director, Graduate
Degree Program

Accepted this 15th day of May 1989

ABSTRACT

Decision Making for Contingency Operations: Different Conflicts, Different Challenges. by Major Mark T. Kimmitt, USA, 46 pages.

This monograph deals with decision making in contingency operations. It begins with the observation that contingency operations are the most frequent method by which the United States projects power worldwide. Studying three areas which appear to differentiate contingencies from conventional operations, the author examines if these differences impose unique decision making challenges on leaders.

The author uses three case studies as evidence for the research question-- Operation BLUEBAT, the 1958 intervention into Lebanon; POWER PACK, the 1965 intervention into the Dominican Republic and URGENT FURY, the 1983 intervention into Grenada. Through the use of elementary decision analysis and game theory, the differences observed in contingency operations are modeled and explained.

The author concludes with an evaluation of the factors which characterize contingency operations, and the implications for contingency force commanders. If the United States continues to conduct such operations then it becomes imperative for military leaders to understand the different conflicts and the different challenges of the contingency operation.

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

Table of Contents

	Page
I. Introduction	1
II. Time Sensitivity and Ambiguity in Contingency Operations . .	4
III. The Joint and <u>Ad hoc</u> Nature of Contingency Operations. . . .	15
IV. Risk Aversion, Ambiguity and Resource Misallocation in Contingency Operations.	28
V. Conclusion	35
Endnotes	40
Bibliography	43

Figures

A. Elementary Decision Tree	7
B. Decision Trees with assigned Subjective Probabilities. . . .	8
C. Decision Trees with conflicting Objective Functions.	12
D. Joint Participation in Selected Contingency Operations, 1958-1986	16
E. Game Theory Matrix of Pure Conflict.	20
F. Game Theory Matrix of Partial Cooperation.	22
G. Utility/Risk Preference Curves	31

I. Introduction

The operation in Grenada was a success, and organizational shortcomings should not detract from that success or the bravery and ingenuity displayed by American servicemen. However, serious problems resulted from organizational shortcomings which should be corrected. URGENT FURY demonstrated that there are major deficiencies in the ability of the Services to work jointly when deployed rapidly.

On 25 October 1983, U.S. military forces deployed to the island of Grenada in response to a worsening internal crisis. While in Grenada, they conducted a series of military operations designed to seize key airfields, rescue American citizens, destroy the Grenadian Revolutionary Army and restore democratic rule. Although on the island for over 30 days, combat casualties were relatively light, and a majority of objectives were successfully taken. Overwhelmingly positive public opinion convinced the Reagan administration that URGENT FURY was an unqualified success.

Military observers saw URGENT FURY from a different perspective. Coming as it did on the heels of the Lebanon peacekeeping operation and only 3 years after the Iranian rescue attempt, the intervention in Grenada was needed proof of America's capability to project military power worldwide. Although a relatively modest and local intervention, URGENT FURY demonstrated both the capability and resolve of the United States

to defend national interests worldwide.

URGENT FURY also provided another chapter in a lengthy history of U.S. contingency operations. In Americans at War, Daniel Bolger identifies seven such operations since 1975 alone. He feels such contingency operations are now the model for U.S. worldwide intervention. Reluctant to risk nuclear confrontation in a general war and unwilling to fight prolonged conflicts, such operations suit a particularly "American" style of war.²

This monograph explores one aspect of contingency operations, the role of decision making. Recognizing the essentially subjective nature of decision making, one must ask if the unique environmental, organizational and behavioral factors involved in contingency operations affect the decision process. Through an analysis of three contingency operations-- the 1983 intervention into Grenada, the 1965 intervention into the Dominican Republic and the 1958 intervention into Lebanon-- six factors will be analyzed. These factors, compiled through the study of numerous American contingencies, appear to impact upon the decision making process. They include:

1. Time Sensitivity. Contingency operations are viewed as time sensitive. Quick action is considered essential to mission success. The result is a condensed mobilization, planning, deployment and execution schedule.

2. Ambiguity. Contingency operations suffer from high levels of uncertainty and often suffer from intelligence shortfalls.

3. Task Organization. Forces and command structures are often Ad Hoc organizations, assembled solely for the duration of the contingency.

4. Joint Organization. Contingency operations are rarely conducted with anything but joint forces.

5. Resource Misallocation. The time sensitivity, ambiguity and political significance of the operations results in extensive resource inefficiency throughout each of the contingencies studied.

To fully understand the unique characteristics of contingency operations and how they may shape the decision making process, historical analysis and game theory will be used as research tools. While historical analysis provides evidence in support of an argument, game theory and decision analysis provide unique tools for explanation. The use of both tools offers a rich pedagogy for the highly behavioral issue of decision making. By determining the factors unique to contingency operations and their effect on the decision making process, a number of game theory and decision analysis models can be developed to explain these challenges. Should these factors prove important, then their identification and understanding is essential to our success in contingency operations.

II. Ambiguity and Time Sensitivity in Contingency Operations

Commanders must operate under conditions of stress and uncertainty. The amount of available information varies greatly and is usually time sensitive...Under these conditions, commanders tend to rely on sub-optimal, simplifying decision making strategies or heuristics.

The very nature of contingency operations implies a short-term focus with a well defined end. JCS Pub 5-00.2 (Test), Joint Task Force (JTF) Planning Guidance and Procedures refers to "short-notice contingency operations [which]...potentially include a wide variety of military activities [with] specific, limited objectives⁴. The organization responsible for carrying out the operation is "...dissolved when the purpose for which it was created has been achieved."⁵ Another definition, which Dan Bolger terms as "expeditionary combat" is:

..the deployment of a small military force into a hostile area to accomplish certain definite objectives. [Contingencies] are temporary in nature and normally of brief duration. Often, they respond to a unique, urgent threat...Most are "joint", in that they involve more than one armed service. With little time available and in an unexpected situation, expeditionary forces face particular challenges in intelligence analysis, communications and coordination.

Both definitions detail many features of contingency operations, especially their temporary or short term nature. Among the problems associated with time sensitive operations, three highlight the difference between a contingency and a

conventional operation. First, the limited available time implies that decisions are required far sooner than otherwise may be expected in a conventional operation. Second, the ambiguity of the contingency environment means that those decisions, while required rapidly, are normally made with far less information. Third, ambiguity in the environment may cause the key players in the process-- the leader, his staff and the subordinate commanders-- to work at cross purposes.

Short decision cycles characterize contingency operations. One day after rebels entered the Dominican Republic capital of Santo Domingo, the JCS sent a formal execute order to the Caribbean Ready Group to proceed from its position off Puerto Rico. There existed "...a serious threat of a communist takeover and very little time... in which to act"⁷. Ordered to plan and execute the evacuation of 1200 American citizens in a nation beset by civil conflict, "Enroute to their destination, Commander James A. Dare, commander of the Task Group (TG 44.9) and Colonel George W. Daughtry, commander of the 6th MEU, devised an evacuation plan."⁸ Seventy-two hours after receipt of the JCS order, Marines landed in the Dominican Republic.

URGENT FURY, too, was conducted on extremely short notice. In response to a deteriorating situation in Grenada, the JCS instructed Admiral Wesley McDonald, Commander, LANTCOM to move the Lebanon-bound USS Independence carrier battle group south

towards Grenada on 20 October 1983. On 23 October, President Reagan signed the formal execute order and on 25 October forces parachuted into Grenada.⁹ Both examples very clearly show the rapidity associated with contingency employment decisions.

Rapid decisions require a combination of intelligence, experience and judgement. In Background to Decision Making, William A. Reitzel discusses the unique nature of military decision-making and the variables which enter into the process. Regardless of the systems and formats which the military imposes on the decision-making process, he believes

...whatever may have been done by military organizations to regulate the decision process and to develop controlled responses in their members, the most complex forms of decision are fundamentally patterned after the basic individual processes for dealing with uncertainty.¹⁰

Decision theory and risk analysis focuses upon decision making in uncertain situations. Studies have demonstrated that learning and experience play heavily in dealing with uncertainty. Reitzel feels:

..human behavior in uncertainty situations is, for adults, learned behavior (and the) learning process plays a significant part... there are two ways of learning-- by repetition, or by understanding... meanings acquired through repetition depend on situations recurring over and over again; and learning results in habitual reflex responses...The French have a phrase, "deformation professionnelle", to describe the fact that a man develops, on the basis of his past experience in a particular professional environment, an informed expectancy concerning the way things will happen in that environment.¹¹

Such experience and learning is critical to the essentially subjective nature of decision making. Lacking sufficient information to make a decision, the leader replaces certainty with past experience, learning and judgement. From this analysis, potential outcomes are considered and probabilities are assigned to those outcomes. An example illustrates this point.

A common game among gamblers is betting "on the next pitch". The rules of the game are quite simple- should the next pitch be a ball, player A wins; should the next pitch be a strike, player B wins. Unlike a simple flip of a coin, whose probability is roughly equal, the "next pitch" requires a tremendous knowledge of baseball. Such information includes general knowledge of the current game as well as highly specific and personal knowledge of the pitcher and the hitter. Thus, the uncertainty of the situation can be reduced dramatically through study, experience and judgement, and relatively accurate probabilities (or odds) can be assessed for the bet. Portrayed graphically, a \$20 bet looks as follows:

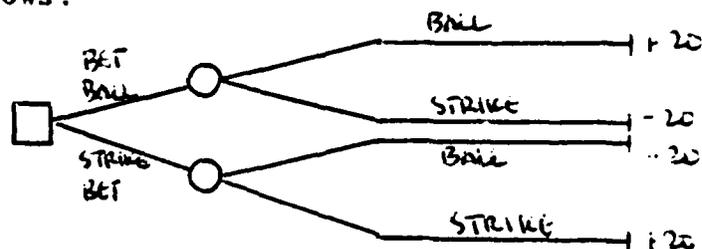
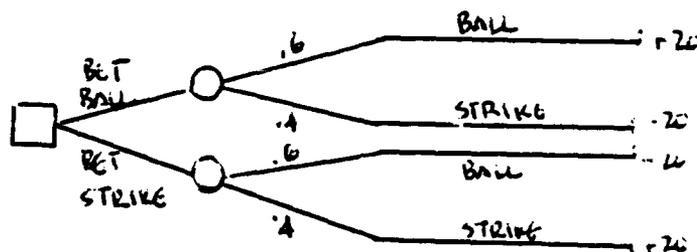


Figure A. Elementary Decision Tree

The squares represent decision alternatives. The circles are "events" or outcomes that the decision maker has no control over.

To complete the decision analysis, the bet maker assesses the odds through subjective probability assessment. By placing well reasoned odds on the outcome, he decides which bet to take:



Expected Value: Ball = +\$4

Strike = -\$4

Figure B. Decision Tree with assigned subjective probabilities

In order to complete the bet, the other gambler's probability assessment will have to be so different as to reverse the expected value of the bet.

For the soldier, the actual outcome of a "bet on the next pitch" is unimportant. The point it illustrates is not. Subjective probability assessment relates directly to contingency and conventional operations. An assessment is required any time uncertainty is present. While such assessment is necessary in both type of operations, the magnitude of uncertainty and ambiguity which surrounds the contingency operation necessitates

far more experience, training and historical study in contingency operations. Such a disciplined approach to the preparation for contingency operations may moderate the uncertainty which accompanies contingency operations.

The third point, the potential for ambiguity leading to cross-purpose behavior within the contingency organization, further demands that the leader focus the efforts of the organization. In a contingency organization--especially ad hoc organizations so typical of contingencies--there may be a tendency for individual rather than organizational objective maximization. While this is true in any organization, the short-term, ambiguous nature of the contingency operation reinforces this phenomenon.

Peter Fishburn, in Decision and Value Theory, writes:

When doubts arise in an individual's mind and he is uncertain as how to best pursue his objectives, then the element of indecision and subsequent decision begin to form. [Reaching] a state of resolution or solution [requires] two steps...The first is to recognize, discover or construct...courses of action or strategies. The second major step is to evaluate alternative strategies by means of a criterion of choice..and to determine the "best" strategy for the individual to follow.¹²

In ambiguous contingency operations, the cross-purposes of the various actors could impede and detract from the success of the mission. This cross purpose behavior might best be explained by a notional example. Assume an organization has recently been

tasked to conduct a short-term contingency operation. Further, assume that the notional mission involves the landing of a force on foreign territory. The potential enemy courses of action are limited to two: An unopposed landing, which is assessed at 90 percent probability, and an opposed landing, with a probability of 10 percent. Once these courses of action are briefed, the decision cycle of the contingency organization begins.

The three main actors-- the leader, his staff and the subordinate commanders-- may each view the enemy situation from a different perspective. Game theorists define this as a non-cooperative, non-zero sum game. The leader is concerned with the overall success of the mission, and would prefer that the staff plan for both contingencies. If forced to choose a course of action he could logically select either the one which confronts an opposed landing or the one which confronts an unopposed landing. Either would be an appropriate response. If relying upon the military tenet to focus upon capabilities rather than intentions, he may choose to concentrate on an opposed landing. Yet, with limited resources, multiple tasks and the higher probability, he may order preparations for an unopposed landing.

The staff would prefer to concentrate their limited planning time on one plan and, rationally, the most likely. Assessing probabilities, it is in their best interest to focus their limited planning time on the most likely course of action. They

would prefer to spend little time preparing for low probability alternatives. Their primary resource, time, is a zero-sum commodity. Any time spent on alternatives is time taken away from developing and refining the primary plan.

The subordinate commanders would prefer to focus on the worst case course of action. Whether risk neutral or risk averse, there is little cost in demanding resources for the worst case alternative. If the assessment is wrong, the subordinate commander may be slightly embarrassed by an excess of resources. But, the excess resources he obtained for the more dangerous course enhances his chances for success. He has, in a sense, "insured" his success.

This paradox is best portrayed by the use of decision trees. Each actor has a different perspective on the problem. Each is certain to see the problem from a different viewpoint, and each seeks a different objective. For the staffer, his most important resource is time--every extra minute he has to devote to the most likely course of action results in the development of a better plan. The subordinate commander, in contrast, is in direct opposition to the staffer. He is far more interested in averting the worst case outcome. The commander must weigh this operation in light of current and future operations. He must temper his resourcing of this operation with the knowledge of sequential and simultaneous operations. These different objectives can be

simultaneous operations. These different objectives can be illustrated as follows:

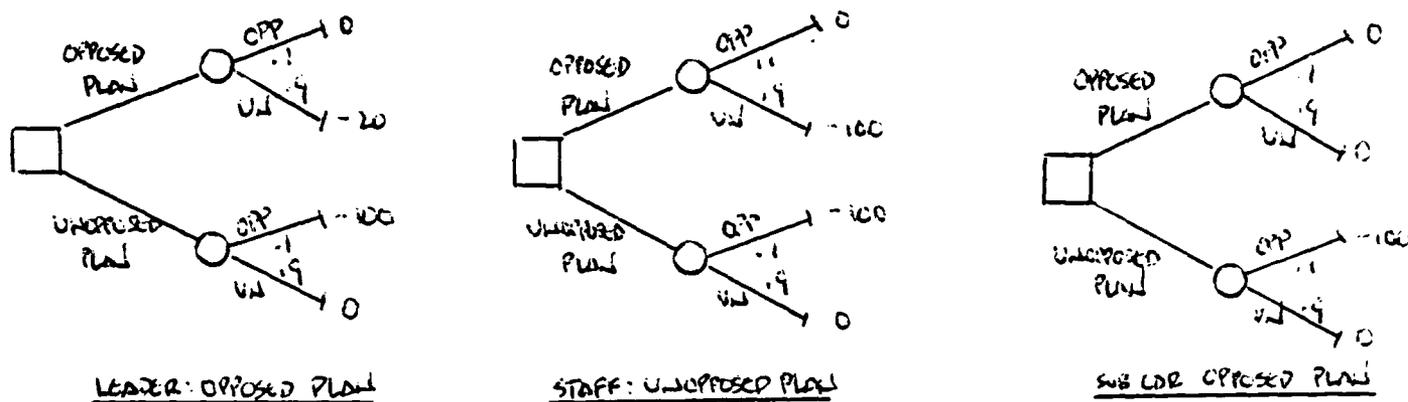


Figure C. Decision Trees with conflicting Objective Functions

This diagram illustrates the overarching responsibility of the leader to issue clear, articulate guidance in precisely the environment that mitigates against its possibility. Although ambiguity and uncertainty abound as inputs for the leader, he must issue clear, specific guidance to his staff and subordinates. Without such guidance, the potential for cross-purpose behavior within the organization is real. In game theory, when all players are of equivalent rank and authority, the organization struggles towards an equilibrium that attempts to satisfy individual objective functions. Unfortunately, there exists a real chance that the equilibrium satisfies no one-- especially the organization. On the other hand, the presence of a clear, dominant leader changes the environment so that the

subsumed by the objective function of the leader.

A recent article in Military Review challenges the notion that the leader conducts involved subjective probability assessments prior to making decisions. In "Strategies of Decision Making", Gary A. Klein contends that concurrent option or decision analysis techniques are fine in theory, but the time pressures involved in operations mitigate against their use. In their place, leaders use a system of "Recognitional Decision Making", by which they draw on:

...experience to recognize the key aspects of the situation, enabling a rapid reaction...They are not searching for the best option. They only want to find one that works, a strategy called "satisficing"...We have found that ...experienced decision makers handle 50 to 80 percent of decisions without any effort to contrast two or more options.¹³

While Klein may contrast this style of decision making with the more analytical method of probability assessment, in fact the two systems are quite similar. While sorting through his data bank of past experience, the leader is implicitly assigning "similarity probabilities" to those past experiences. His "recognition" is based on a matching process, which is simply an underlying probability assessment. In both cases, the leader draws upon experience and judgement to form his decision criteria.

In either case, the time compression and ambiguity of the contingency operation interacts with the leader's background.

Unfortunately, the background of many leaders is at best neutral and often counterproductive. Spending much of their careers fighting conventional, Central European operations, they may not have the training, experience or background to draw upon in a contingency operation.

What is needed in a contingency operation is a leader with a tremendous amount of experience and training in similar operations. This experience, say Reitzel, provides the foundation of professional knowledge which tears away the fog of ambiguity. Such a leader ensures that the compressed time sequence, high ambiguity and conflicting objectives common to contingency operations do not detract from the accomplishment of organizational goals.

III. The Joint and Ad Hoc nature of Contingency Operations

The fact remains that the services are not alike, that no one can make them alike...on the question of fundamental loyalty, the officer who loves every other service just as much as his own will have just as much actual virtue as the man who loves other women as much as his own wife.

The Armed Forces Officer

Invariably, contingency operations are joint operations. Conventional operations, while making great strides towards the implementation of AirLand doctrine, are typically single service operations. Assistance from other services is usually relegated to a subordinate role. Contingency operations, in contrast, are almost always joint. Forces have to be marshalled, transported and supported by air and sea. Objectives have to be taken by the ground soldier, either Marine or Army. Table I demonstrates the level of joint participation in contingency operations of the last 35 years.

Having established the organizational nature of contingency forces, this section focuses on U.S capabilities to execute contingency warfare with joint forces. If the initial proposition is correct, that military intervention in the future will be primarily contingent in nature, then these interventions

Figure D.

Joint Participation in Selected Contingency Operations, 1958-1986.

	Lebanon	Dominican Republic	Mayaguez	Iran	Grenada
USN					
Carriers	X	X	X	X	X
Surface	X	X	X	X	X
Amphib	X	X			X
USAF					
Tactical	X	X	X		
Airlift	X	X	X	X	X
Tankers			X	X	X
Recon	X		X	X	X
USMC					
Ground	X	X	X		X
Air	X			X	X
USA					
Ground	X	X		X	X
Air	X	X	X		X
Allies	X	X			X

Source: Adapted from Americans at War, p. 450

require officers skilled in joint operations. Without intending to open the entire Goldwater-Nichols debate, one cannot ignore the requirement for trained and experienced joint decision makers at the helm of contingency operations. Yet, the experience of our senior leaders continues to concentrate on single-service assignments. Many reasons exist, but the root cause comes as no surprise. Officers, behaving rationally, seek advancement and promotion. As long as promotion and advancement continue to (actually or perceptively) tilt heavily towards those who spend time in single-service positions, then the incentives to seek out joint service duty remain diminished. The general perception among officers is that a joint assignment:

...is the "kiss of death" as far as a continued military career is concerned. In contrast, Service assignments are widely perceived as offering... career enhancement. As a result, many fine officers opt for Service assignments rather than risk a Joint assignment.¹⁴

While promotion and selection boards may attempt to redress this imbalance through quotas, floors, and joint duty prerequisites for promotion to general officer, overwhelming incentives point the officer to single-service job opportunities.

The second problem associated with joint operations is that of competing and conflicting interests among individuals and services. While joint operations should have unity of command and

singleness of purpose, the realities of interservice rivalries and competing interests surface in every Joint operations studied.

In Grenada, the services developed separate and exclusive plans for URGENT FURY. The special operations community developed a plan which would have accomplished the mission with the help of the 82nd Airborne Division. The Navy, on the other hand, devised a plan using only a carrier task force and Marines. The final plan drawn up by Admiral Wesley McDonald and his staff was a compromise. It included elements of each service plan in an attempt to "...use the best available units on particular military objectives."¹⁵ Yet, cross-purpose behavior did not end there. The command and control organization was basically ad hoc. The island was split into two separate "theaters", each having its own ground commander. Quite unlike a doctrinal JTF chain of command, this arrangement was directed because of "...the reluctance of the individual services to allow another service command of its units."¹⁶

Roger Spiller, observing similar confusing and cross-purpose behavior during Operation BLUEBAT in Lebanon noted that:

...one is impressed by the wave of "provincialism" which dominated military planning as well as by a certain parochialism in the services. The vision of what was really three provisional military organizations-- the Marines, the Army Task Force and the Composite Air Strike

Force-- descending upon Beirut may have been unnerving to the hapless "rebel" in the Basta, but it would have been welcomed by a determined and professional enemy.¹⁷

Game theory explains some of this behavior. As a branch of politics and economics, game theory attempts to model the behavior of individuals and organizations that have conflicting interests, but mutual dependence.¹⁸ It recognizes that situations which require joint resolution exhibit elements of both conflict and cooperation. These

... conflict situations are essentially bargaining situations. They are situations in which the ability of one participant to gain his ends is dependent to an important degree on the choices or decisions that other participants will make.¹⁹

Joint organizations exhibit many of these characteristics. As an example, imagine a joint contingency operation with only two planning officers, one army and one navy. Brought together for the contingency, they will probably initiate their planning based on the maximum use of their own service. Let's further assume that the "payoff" each strives towards is a "top block" OER, represented by a 1, with less favorable OER outcomes represented by blocks 2 through 10. While planning, they quickly realize that they are in conflict with the other service, as both attempt to maximize the use of their own service. Yet,

they realize that while in conflict, they also are mutually dependent upon the other service for concurrence of the plan. Their dilemma can be represented by the following matrix:

		Navy Planner	
		Army Plan	Navy Plan
Army Planner	Army Plan	1, 5	10, 10
	Navy Plan	10, 10	5, 1

Figure E. Game Theory Matrix of Pure Conflict

The first number in each box is the expected OER outcome for the Army officer. The second number is the predicted OER outcome for the Navy officer. So, should the Army and Navy officer agree on an Army plan (top left), the Army officer would receive a "Top Block" OER, while the Navy officer would receive a 5 Block for failing to represent his service. The 10, 10 boxes represent the fact that should the two officers arrive at an irreconcilable impasse, the time will slip away, no plan will be

forthcoming and they will receive a career ending 10 block.

Yet, such a situation is almost pure conflict and no cooperation. Neither side is willing to compromise, as the compromise payoff (a 5 block) is still too low. This is not very realistic, as "Most bargaining situations ultimately involve some range of possible outcomes within which each party would rather make a concession than fail to reach agreement at all."¹⁰

The resolution to this deadlock, of course, come in the form of a compromise-- a joint plan. Eliminating the highly unlikely possibility of one service embracing another service's plan in toto, the potential outcomes are represented as follows:

		Navy Planner	
		Joint Plan	Navy Plan
Army Planner	Army Plan	1, 4	10, 10
	Joint Plan	2, 2	4, 1

Figure F. Game Theory Matrix of Partial Cooperation.

Again, the planners cannot achieve a "Top Block" rating without a poor rating for their fellow officer. Allowed to negotiate, they will conclude that a joint resolution will not allow them to achieve their optimal payoff, but cooperation will result in a 2 block rather than a 4 or 10 block. This model represents the partially cooperative and partially conflicting nature of joint contingency operations. Known as the Prisoner's Dilemma, it is an appropriate model to suggest for the joint environment, as the best outcome for all concerned results when each player refrains from maximizing his own payoff. Played properly, the organization optimizes from sub-optimal individual payoffs.

The 1958 Lebanon intervention, like Grenada, saw the Army and Navy try to interject their own forces at the expense of the other services. Finding themselves in a Prisoner's Dilemma, each service had contingency plans calling for the successful accomplishment of the mission without the use of multi-service forces (the preferred, joint optimizing payoff). Yet, the imposition of a joint requirement meant that they would have to settle for less than optimal payoffs in terms of force representation. Had they continued individual maximizing behavior, they could well have reached an insoluble impasse. Working towards joint optimization resulted in sub-optimal

payoffs, but avoided minimal payoffs and optimized the joint outcome.

This typifies one of the key leadership requirements of the contingency commander. He must tailor his force to best meet mission requirements, then defend this choice to the services which will invariably take issue with his choices. While the preferred method would be through positive and persuasive leadership, other options are available. Changing the payoffs in the "game" so that the best option is an individual and joint maximizing payoff is one method. Allowing the joint organizations to write OERs for officers serving in temporary, ad hoc billets is another.

All these alternatives require that the decision maker has the power to decide, reward and punish. Yet, the weak authority commanders hold over service components is a longstanding shortcoming in joint operations. Limiting the authority of the Unified commander pervades JCS Publication 2, Unified Action Armed Forces (UNAAF). Tracing its roots to the Key West Agreement, the prerogatives of the service take precedence over the authority of the commander. Testifying before Congress, the Commander in Chief, U.S. Pacific Command stated:

Although this organization is intended to optimize wartime employment of combat forces provided by the Services, it does go to some

length to protect the integrity of individual service operations within multi-Service operational commands. In doing so, it places certain limits on the authority of the unified commander that could affect operations (combat or otherwise).¹¹

The last problem associated with the use of joint forces in contingency operations is their ad hoc nature. Ideally, the force composition is based on specific capabilities and specific needs. In reality they are selected simply because they are available. Few theater CINCs have sufficient forces for every contingency in their area of responsibility. Often they must dip into forces of other theaters or the U.S. strategic reserves. The Marine force which landed at Grenada was on its way to replace the garrison at Beirut. The majority of 82nd Airborne forces which went into the Dominican Republic were never part of the contingency plans. Forces originally designated for Operation BLUEBAT-- the Strategic Army Corps-- were scratched due to the unavailability of strategic lift assets. An obstruction on the departure airfield resulted in the elimination of planned tactical air assets for Lebanon and their replacement by a green Tactical Fighter Wing.

The ad hoc nature of these forces presents the contingency commander with an unusual phenomenon, called

"On the Beach" behavior, after the book by Nevil Shute ²². This phenomenon recognizes that the contingency has a definite endpoint, that the organization has been established to complete a specific task, and it will dissolve upon completion of that task. Most game theory presupposes that bargaining and cooperation occurs for a number of reasons. A principle reason is that the behavior is controlled and assisted by the long-term nature of the relationship. Thus, much bargaining behavior is characterized by compromises in order to maintain long-term harmony and cooperation. Characteristic of conventional operations, long-term working relationships are established and promoted to ensure maximum output as well as internal compatibility. Yet, the ad hoc, one-time and short term nature of the contingency operation may bring about dissimilar behavior within staffs and subordinate commands. Unlike "repeated choice" problems where players may value joint solutions such as the Prisoner's Dilemma, incentives exist to ignore the desires of the other player, pre-empt, and seek individual maximization. Incentives to work harmoniously and cooperatively are reduced. Unconcerned about ongoing relationships or cooperation, "On the Beach" behavior attempts to maximize the position of the individual service or staff element at the expense of the joint operation. Such behavior is observed often and may be highly

counterproductive. Reflecting on this problem, a Congressional report noted:

...the officers who serve on the Joint Staff have strong incentives to protect the interest of their services in the joint arena. Joint Staff Officers usually serve only a single tour, and must look to their parent service for promotion and future assignments. Their performance is judged in large part how effectively they have represented Service interests.

If such behavior exists on the Joint Staff, little wonder why it occurs at the Unified or Joint Task Force level.

In conclusion, the contingency force leader must deal with the consequences of joint and ad hoc forces. This implies that he may have to impose sub-optimal payoffs upon his organization in order to seek an optimal solution for joint contingency operations. Never easy in a situation where the organizations have both cooperating and conflicting motivations, it becomes even more difficult in a Task Force environment of ad hoc forces. Thus, the commander must not only exert his leadership downward, he must look upward as well, imploring his superiors to allocate forces which have worked together in the past, will work together in the future and have the motivation to work together for the operation.

The lesson of establishing ad hoc organizations is best expressed by Dr. Roger Spiller in his Leavenworth Paper, "Not War But Like War": The American Intervention in Lebanon. It stated:

The putting together of a special military force which existed only on paper a few hours before is a business with its own special complications. Between the planning and execution of any military operation there lie opportunities for miscarriage which often have little to do with the plans. 14

Short of doctrinal changes in the waging of contingency warfare, these challenges are sure to face leaders in future contingency operations.

IV. Risk Aversion, Ambiguity and Resource Misallocation in Contingency Operations

Overkill, yes, we did overkill and we did it deliberately on Grenada, ..It was a conscious decision to convince the opposition that there was little, if any, opportunity to carry on the fight.²⁵

Admiral Wesley McDonald
Commander, CINCLANT

The tremendous ambiguity and uncertainty which surrounds most contingency operations has led to a uniquely American solution. In the absence of intelligence on enemy capabilities and intentions, resource contingency operations to the fullest. A combination of high political sensitivity, political exposure and public awareness leaves no room for failure.

During Operation BLUEBAT, forces were crammed into the small American airhead surrounding the Beirut Airport. Less than 10 days after the first Marines had landed, the "saturation point" had been reached. Yet, additional forces were still deployed into Lebanon. The impact of the "American Solution" is depicted by Roger Spiller in "Not War but like War". Discussing:

...the impending arrival of the 3rd Medium Tank Battalion...Gray doubted that this battalion was needed at all. The marines had brought 15 medium tanks, 31 LVTPs and 10 Ontos... In Gray's opinion, 72 additional medium tanks were too much... However, USAREUR insisted upon sending the battalion (and) the armor was coming, whether he needed it, wanted it, or not.²⁶

The Dominican Republic and Grenada operations also felt the weight of American resources. Prior to commitment in the Dominican Republic, contingency plans were developed for a variety of alternatives to include a full intervention. In the event of such an intervention, the plans called for a maximum of six airborne infantry battalions and four Marine battalion landing teams. Although the actual intervention was not radically different from the contingency plans, President Johnson eventually committed the majority of the 82nd Airborne Division, more than three Marine battalion landing teams and:

...in hopes that the mere psychological impact of a large-scale commitment of US troops might end the fighting in the Dominican Republic, he had indicated that he was willing to deploy the remainder of the 82nd Airborne, and, if necessary, the 101st Airborne Division to "take and hold" the country.

Grenada, too, witnessed such behavior. In testimony before congress, General Wickham stated:

My feeling is that we had a force sized for the unknown. It was about double which we might have had if we had special and good consolidated validated intelligence.

Such behavior in the face of uncertainty is not irrational. Given a great deal of uncertainty, the ability to overresource, a posteriori, contingencies is a luxury that the

United States could afford. Yet, should the scale of a future contingency demand more conservative allocation of resources, contingency leaders have little historical precedence on which to rely. In the absence of history, decision theory may provide a substitute.

The issue of risk aversion among seniors and subordinates should be understood by the contingency commander. The concept of risk tolerance recognizes that individuals demonstrate different attitudes in the face of ambiguity and risk. This attitude impacts directly on the character of decisions. For example, two individuals, all things being equal except tolerance for risk, will generally make two unequal decisions.

For this study, three individuals will be examined, one demonstrating risk neutrality, one risk aversion, and one risk seeking tendencies. Their utility functions, graphing preference towards risk and return, are plotted in Figure G. As observed, the risk averter demands far more return (resources) for each unit of risk he is willing to take. The risk neutral subject, in contrast, demands less for undertaking the same risk. The difference between what the risk neutral subject and the risk averting subject demand is known as a risk premium (line AB). This premium is a function of each individual's tolerance for risk, and has direct consequences for the leader.

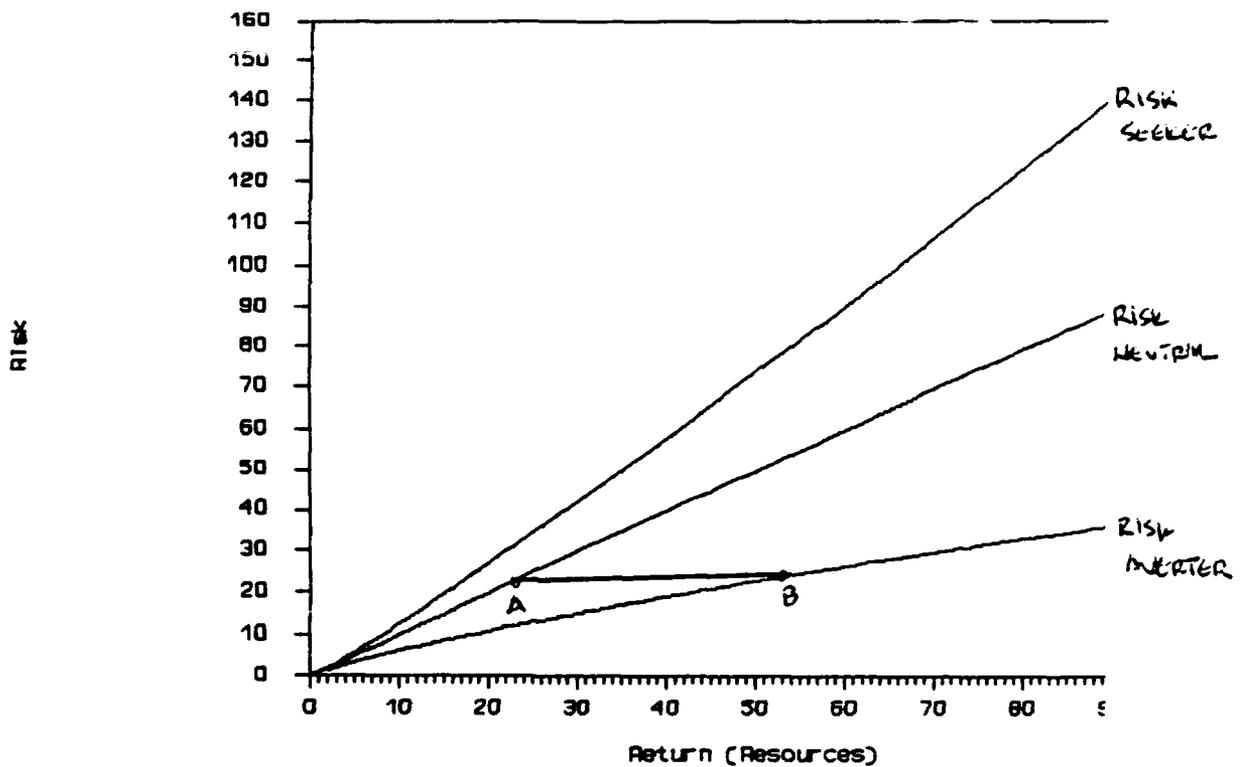


Figure G. Utility/Risk Preference Curves

This concept reveals the potential for overresourcing a force solely on the basis of an individual's risk profile. As an example, consider the commander who asks a sub-unit commander, "How many forces do you need to attack and secure that beach?" Two Marine commanders, equal in all talents except risk tolerance, may come up with two separate answers. The first Marine, risk neutral, might request three Battalion Landing Teams. The second, a risk averter, could demand four Battalion

Landing Teams. Both commander's judgement may be sound, reasoned and experienced, yet their subjective attitude towards risk results in different requests.

A risk seeker is one who feels it necessary to undertake greater risk with less return than the risk neutral or risk averter. Such behavior is demonstrated by Zbigniew Brzezinski, President Carter's National Security Adviser during the Iran rescue attempt. When asked why only eight RH-53Ds were committed to the rescue attempt, Brzezinski displayed the classic profile of a risk seeker. As Bolger observed:

The national security adviser became obsessed with keeping the operation "as lean and closely honed as possible," to avoid Iranian radar and signal detection. His "gravest concern" revolved around compromise of the mission, and he feared domestic political criticism in that event. Said Brzezinski afterwards, "If the Iranians had discovered the mission because of the size of the air armada...we would doubtless be charged with typically excessive American redundancy, with unwillingness to go in hard and lean (as) the Israelis did at Entebbe."¹³

The failure of the Iranian rescue hostage should not, in itself, be evidence that risk seeking behavior is irrational. Quite the contrary, it appears that the behavior, a priori, of Brzezinski was logical and well thought out. Yet, his military inexperience and failure to understand the differences between Entebbe and Tehran and a belief that a superpower could pull off

the impossible on a shoestring led to the mission staying
"...secret and lean, but America came up a helicopter short."¹⁰

Such attitudes towards risk, while important in a conventional operation, become critical in a resource constrained contingency operation. The contingency commander may not have the luxury of a Commander in Chief such as Lyndon Johnson, willing to send two divisions in place of six battalions. Even if such a commander is in office, the physical limitations of Transportation Command may prevent the resources from timely arrival. Quite the opposite, the commander may be confronted with a Brzezinski-like authority, willing to risk American lives with a poor appreciation of the minimum essential necessities. In either case, the contingency commander must ensure risk preferences and resource allocation are understood and incorporated into the decision process.

The commander can confront resourcing issues through the notions of risk aversion and resource optimization. Given a finite level of resources, he must accomplish his mission through the optimal allocation of forces and equipment. This highlights the difficult responsibilities of executing the mission and the allocation of resources among potentially competing subordinates. Field Marshal Sir William Slim expressed this best in Defeat into Victory, stating:

Very rarely had any formation more than its basic needs. If it had, it meant that some officer, with the understandable but selfish desire to be able to say, "Thanks to me, our troops are better off than other troops" had somehow got hold of more than his fair share. It was a natural failing, and the Army staff soon came to know who were the greedy ones, units and formations.

In the future, contingency commanders may find the military and political leadership unwilling to entertain an intervention unless the odds and the resources are overwhelmingly in our favor. In this situation, risk aversion and resource misallocation are issues that the decision maker may ignore. Regardless of the risk preferences of seniors and subordinates, regardless of how much in error his predictions, the military might of the United States, selectively employed, can cover those bets-- and raise them if necessary. Yet, should the leader find himself tasked to execute a contingency against a well disciplined adversary, able to match his forces and equipment, the issues of risk aversion, ambiguity and resource allocation may be the greatest challenges he faces.

V. Conclusion

In virtually all situations such as the Dominican intervention, officers and enlisted men responsible for making and executing decisions have had (and will have) to anticipate the kinds of problems that have been inherent in mounting joint operations.

Should a crisis arise, the military must be ready to respond. This response may take the form of a contingency operation, and the response will be with the forces, plans and doctrine in existence. Much has been done to advance U.S. capabilities in the decade, and U.S. forces are probably well ahead of any previous generation in this regard. The resurgence of joint doctrine, advances in hardware interoperability and a generation of officers routinely serving in joint assignments must surely improve these capabilities.

Those chosen to lead such contingencies cannot rely on these advances alone. The leaders at theater, task force and service command level must realize that such operations offer different challenges and demand unique talents disregarded in conventional operations.

The first challenge is to conduct operations despite limited information and intelligence. While many observers cite the paucity of intelligence for URGENT FURY, the commanders of

that operation recognized that the absence of intelligence did not eliminate the need for key and timely decisions. Testifying before Congress, Admiral McDonald stated:

We had basic intelligence sufficient to start the noncombatant evacuation... in a general sense the national intelligence agencies provided us with an adequate overview of Grenada. The operation was very time compressed.. and from that standpoint, we were lacking. But I do not wish to cast an aspersion on or decry the inadequacy of the intelligence. Basically, given what the collection sources were and the time frame we were operating in, the intelligence was adequate to plan the operation.³³

His immediate subordinate, Vice Admiral Joseph Metcalf, Commander of JTF 120, was more laconic:

You know, the on-scene commander never has enough intelligence. It is one of the propensities of the profession...But those are the breaks of Navy Air, as they say. We would like to have had it better. But this is what we went for.³⁴

Just as the ambiguity of the situation imposes difficulties on leaders, so too does it strain staffs and command elements. The leader must recognize the effect of ambiguity on his subordinates and he must take steps to prevent this confusion from leading to cross purpose and counterproductive behavior. Admiral Metcalf inherited three separate, and to a large degree

exclusive plans. Yet, he attributed the success of URGENT FURY to:

One thing-- we kept it simple. When we put the plan together, we had the various elements fighting as they trained to fight. The 82nd operated as they operate, and the Marines did their thing the way they do things and the Air Force did theirs.³⁵

URGENT FURY saw a clear case of the first unique challenge facing the contingency commander-- the requirement to rapidly make decisions and set organizational priorities in the midst of extreme ambiguity and confusion.

Yet, simply focusing efforts in the midst of confusion is insufficient to describe the unique environment of the contingency operation. Adding to the challenge is the use of joint and ad hoc forces normally assembled for contingency operations. For example, while Operation BLUEBAT was planned and organized from the outset as a joint operation, the consistent lack of integrated execution and continuing service parochialism throughout led to complaints of separate and provisional military organizations. By one observation:

A less charitable interpretation would have been that now that the Army had moved 2100 miles, it had to play a part in the intervention.³⁶

which led to the conclusion that:

Arrangements left unmade...were not merely important for the sake of organizational elegance. Virtually every official report opens with the caveat that had Operation BLUEBAT been opposed, disasters would have occurred.³⁷

Contrast this with an observation made on URGENT FURY-- a quintessential Joint and ad hoc organization:

I think finally I would just highlight the fact, as I highlighted in the Ranger raid on Grand Anse, the ability of the services to come together and in very short order get the planning done that is required among services, using all the assets available, in order to accomplish a mission.

You know, when you consider we had really... 5 hours less 45 minutes from the time we were notified until we had 224 students out of there, and we used every service, I think it is a testimony to the joint training that we are trying to do in the services.³⁸

The leader must recognize the shortcomings of such behavior and fully articulate a solution to the conflicts existing in ad hoc organizations.

Finally, the leader cannot ignore the effect of ambiguity and poor intelligence on resource decisions made by actors with differing risk profiles. The decision maker must understand the concept of risk tolerance and how it will affect the judgement of both seniors and subordinates. The three case studies, unfortunately, are illustrative of risk averse personalities who had the both the authority and capabilities to overresource their

risk aversion. Lest one conclude that all contingencies are overresourced by risk averse leaders, an examination of other case studies-- especially the Iranian rescue attempt-- will demonstrate such operations dealing with constrained resources and differing risk profiles.

In conclusion, decision making in contingency operations presents leaders with factors that, if not absent from conventional operations, surely assume more predominance in contingencies. The value of history to illustrate and game/decision analysis to explain these factors show that ambiguity, time sensitivity, joint and ad hoc forces as well as risk aversion and resource misallocation assume far greater importance in contingency operations. Should the United States conduct contingency operations in the future and should the services continue planning and executing these missions as in the past, leaders are well advised to study, practice and evaluate such operations. Only through such discipline will they begin to understand these different conflicts and these different challenges.

ENDNOTES

1. United States Congress. Defense Organizations: The Need For Change, Senate Armed Services Committee. (Washington, D.C.: Government Printing Office, October 16, 1985), p. 370. (Hereafter referred to as The Need for Change).
2. Daniel P. Bolger, Americans at War (Novato: The Presidio Press, 1988), p. 10.
3. LTC Johnson Beach and Major Brad C. Scott, "Expanding the Limits of Combat Decision Making", Military Review, April 1989, p. 55.
4. JCS PUB 5-00.2, Joint Task Force (JTF) Planning Guidance and Procedures (Test), (Washington, D.C.: The Joint Chiefs of Staff, 1988) p. I-1.
5. Ibid., p. II-1.
6. Bolger, op.cit., p. 12.
7. Dr. Lawrence A. Yates, Power Pack: U.S. Intervention in the Dominican Republic, 1965-1966, (Leavenworth: Leavenworth Paper Number 15, 1988), p. 40.
8. Ibid., p. 38.
9. Bolger, op.cit., p. 273.
10. William A. Reitzel, Background to Decision Making (Newport: The Naval War College, 1958), p. 9.
11. Ibid., p. 9.
12. Peter C. Fishburn, Decision and Value Theory, (New York: John Wiley and Sons, 1964), pp. 1-2.
13. Gary A. Klein, "Strategies of Decision Making", Military Review, May 1989, p. 59.
14. The Need for Change, p. 182.

15. Major David T. Rivard, "An Analysis of Operation URGENT FURY", Air Command and Staff College, 1985, p. 3.

16. Ibid., p. 23.

17. Dr. Roger J. Spiller. "Not War But Like War": The American Intervention into Lebanon (Leavenworth: Leavenworth Paper Number 3, 1981), p. 44.

18. Thomas A. Schelling, The Strategy of Conflict (Cambridge: The Harvard University Press, 1980), p. 83.

19. Ibid., p. 5.

20. Ibid., p. 70.

21. The Need for Change, p. 308.

22. Martin A. Shubik. Games for Society, Business and War, (New York: Elsevier Scientific Publishing Company, 1975), p. 45.

23. The Need for Change, p. 178.

24. Spiller, op. cit., p. 30.

25. U.S. Congress. Full Committee Hearing on Lessons Learned as a Result of the U.S. Military Operations in Grenada, House Armed Services Committee. (Washington, D.C.: Government Printing Office, January 24 1984, p.46. (Hereafter referred to as Lessons Learned.)

26. Spiller, op.cit., p. 42.

27. Dr. Lawrence A. Yates, "Mounting an Intervention: The Dominican Republic, 1965" Military Review, March 1989, p. 56.

28. U.S. Congress, Organization, Structure and Decisionmaking Procedures of the Department of Defense, Part 8, Senate Armed Services Committee (Washington: Government Printing Office, 1983), p. 332. (Hereafter referred to as Organization and Structure).

29. Bolger, op.cit., p. 148.

30. Ibid., p. 149.

31. Field Marshal Sir William Slim. Defeat Into Victory, (London: Cassell and Company, 1956), p. 439.
32. Yates, "Mounting an Intervention", p. 61.
33. U.S. Congress. Lessons Learned, p. 24.
34. Ibid. p. 25.
35. Ibid., p. 26.
36. Spiller, op.cit., p. 33.
37. Ibid., pp. 44-45.
38. U.S. Congress. Lessons Learned, p. 27.

BIBLIOGRAPHY

BOOKS

- Blechman, Barry M. and Kaplan, Stephen S. Force Without War: U.S. Armed Forces as a Political Instrument, Washington, D.C.: The Brookings Institute, 1978.
- Reiger Daniel P. Americans at War, Novato: The Presidio Press, 1988.
- DuPuy, Trevor N. Numbers, Prediction and War, Indianapolis/New York: The Bobbs-Merrill Company, Inc., 1979.
- Gleijeses, Piero. The Dominican Crisis: The 1965 Constitutionalist Revolt and American Intervention, Baltimore: The Johns Hopkins University Press, 1978.
- Fishburn, Peter C. Decision and Value Theory, New York: John Wiley and Sons, 1964.
- Kruskal, William H. and Tanur, Judith M., Editors. International Encyclopedia of Statistics, New York: The Free Press, 1978.
- Levy, Haim and Sarnat, Marshall. Portfolio and Investment Selection: Theory and Practice, New Jersey: Prentice/Hall International, 1984.
- Luce, R. Duncan and Raiffa, Howard. Games and Decisions, New York: John Wiley and Sons, 1957.
- MacCrimmon, Kenneth R. et al. Taking Risks: The Management of Uncertainty, New York: The Free Press, 1986.
- McGuigan, James R. and Moyer, R. Charles. Managerial Economics: Private and Public Sector Decision Analysis, Illinois: The Dryden Press, 1975.
- McKinsey, J.C.C. Introduction to the Theory of Games, New York: McGraw-Hill Book Company, Inc., 1952.
- Owen, Guillermo. Game Theory, Philadelphia: W.B. Saunders and Company, 1969.
- Shelling, Thomas C. The Strategy of Conflict, Cambridge: The Harvard University Press, 1980.

Shubik, Martin. Games for Society, Business and War, New York: Elsevier Scientific Publishing Company, 1975.

Slater, Jerome N. Intervention and Negotiation: The United States and the Dominican Intervention, New York: Harper and Row, 1970.

Slim, Field Marshal Sir William. Defeat Into Victory, London: Cassell and Company, 1956.

von Neumann, John and Morgenstern, Oskar. Theory of Games and Economic Behavior, Princeton: Princeton University Press, 1944.

Vatter, Paul A. et al. Quantitative Methods in Management, Illinois: Richard D. Irwin, 1978.

PERIODICALS

Beach, LTC Johnson and Scott, Major Brad C. "Expanding the Limits of Combat Decision Making". Military Review, April 1989, pp. 55-62.

Dare, CPT James A. "Dominican Diary". U.S. Naval Institute Proceedings, December 1965, pp. 37-42.

Duffy, Michael. "Caucus Chief Reveals Faults of Grenada Invasion". Defense Week, Vol 5, 30 January 1984, p. 3.

Klein, Gary A. "Strategies for Decision Making." Military Review, May 1989, pp. 56-64.

Maze, Rick. "Intelligence Limited before Grenada Action". Air Force Times, 21 November 1984, p. 4.

McClintock, Robert. "The American Landings in Lebanon". U.S. Naval Institute Proceedings, Vol 89, No. 9, September 1963, pp. 96-97.

Smith, CPT Kevin B. "Combat Information Flow". Military Review, April 1989, pp. 42-54.

Wade, S.S. "Operation BLUEBAT". Marine Corps Gazette, Vol. 43, No. 7, July 1959, pp. 10-23.

Yates, Dr. Lawrence A. "Mounting an Intervention: The Dominican Republic, 1965". Military Review, March 1989, pp. 50-62.

REPORTS, MONOGRAPHS, ARTICLES AND GOVERNMENT DOCUMENTS

Adams, Donald L. "The Decision-Making Process Utilized by Field Grade Officers in the U.S. Army", University of Tennessee, 1972.

Bowyer, Barbara J. "Toward a Theory of Military Decision-Making", Naval Postgraduate School, 1983.

Conners, Daniel Patrick. "Determining the Nash Equilibrium from the Reaction Relations of the Decision Makers". Coordinated Science Laboratory, University of Illinois, Joint Service Electronic Program, 1984. (DTIC #AD-A161353)

JCS Pub 2. Unified Action Armed Forces, The Joint Chiefs of Staff, 1986.

JCS Pub 5-00.2. Joint Task Force (JTF) Planning guidance and Procedures (Test), The Joint Chiefs of Staff, 1988.

Lawrence, Richard D. "A Study of Quasi-Analytical Models for Improvement of the Military Commander's Tactical Decision Process", (Ph.D. dissertation), The Ohio State University, 1968.

Lopes, Lola L. and Casey, Jeff T. "Tactical and Strategic Responsiveness in a Competitive Risk-Taking Game", Wisconsin Human Information Processing Program, ONR Contract N00014-84-K-0065, 1987.

Reitzel, William A. "Background to Decision Making", The Naval War College, 1958.

Rivard, Major David T. "An Analysis of Operation URGENT FURY", Report #85-2185, Air Command and Staff College, 1985.

Rosenschein, Jeffrey S. and Genesereth, Michael R. "Deals among Rational Agents", Stanford University Programming Project Report #HPP-84-41, December 1984.

Sevier, COL Noble H. III. "Command, Control and Leadership", U. S. Army War College Military Studies Program, 29 March 1988.

Shubik, Martin. "The Uses, Value and Limitations of Game Theoretic Methods in Defense Analysis", Cowles Foundation Discussion Paper #766, 1985. (DTIC # AD-A161986).

Spiller, Dr. Roger J. "Not War But Like War": The American Intervention in Lebanon, Leavenworth Paper Number 3, 1981.

U.S. Congress. Defense Organization: The Need for Change, Senate Armed Services Committee, No. 99-86: Government Printing Office, October 16, 1985.

U.S. Congress. Full Committee Hearing on the Lessons Learned as a Result of the U.S. Military Operations in Grenada, House Armed Services Committee, No. 98-43: Government Printing Office, January 24 1984.

U.S. Congress. Organization, Structure and Decision Making Procedures of the Department of Defense, Senate Armed Services Committee, No. 98-375 Part 8: Government Printing Office, 9 November 1983.

Yates, Dr. Lawrence A. Power Pack: U.S. Intervention in the Dominican Republic, 1965-1966, Leavenworth Paper Number 15, 1988.

Wade, LTC Gary H. Rapid Deployment Logistics: Lebanon, 1958, Research Survey Number 3, Combat Studies Institute, 1984.

Wohl, J.G. et al. "Modeling Human Decision Processes in Command and Control", Alphatech, Inc. Report TR-137, 1983.