

*AN ANALYSIS OF THE PURPOSE AND DEVELOPMENT OF  
MANAGEMENT RESERVE*

THESIS

Kevin T. Gould, B.S.  
Captain, USAF

AFIT/GCA/LAS/95S-3

DEPARTMENT OF THE AIR FORCE  
AIR UNIVERSITY

DTIC QUALITY INSPECTED 8

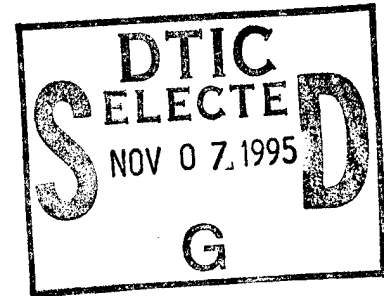
**AIR FORCE INSTITUTE OF TECHNOLOGY**

Wright-Patterson Air Force Base, Ohio

DISTRIBUTION STATEMENT A

Approved for public release;  
Distribution Unlimited

Accession For	
NTIS CRA&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	



*AN ANALYSIS OF THE PURPOSE AND DEVELOPMENT OF  
MANAGEMENT RESERVE*

THESIS

Kevin T. Gould, B.S.  
Captain, USAF

AFIT/GCA/LAS/95S-3

19951102 112

Approved for public release; distribution unlimited

The views expressed in this thesis are those of the author  
and do not reflect the official policy or position of the  
Department of Defense or the U.S. Government.

***AN ANALYSIS OF THE PURPOSE AND DEVELOPMENT OF  
MANAGEMENT RESERVE***

**THESIS**

Presented to the Faculty of the Graduate School of Logistics  
and Acquisition Management of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the  
Requirements for the Degree of  
Master of Science in Cost Analysis

Kevin T. Gould, B.S.  
Captain, USAF

September 1995

Approved for public release; distribution unlimited

## **Preface**

The purpose of this study was to investigate the purpose and the development of the contractor management reserve budget. This was accomplished by reviewing several contractor system descriptions and interviewing numerous individuals who have had experience with cost/schedule control systems criteria.

I would like to thank my thesis advisor, Dr. David Christensen, for his guidance and tremendous patience with me in completing this thesis. I would also like to thank Professor Richard Antolini who provided the necessary contacts that were instrumental in the completion of this thesis. Lastly, I would like to thank my wife, Karen, and my son, Troy, for their immense support, understanding and patience over the past year while completing this program.

Kevin T. Gould

## Table of Contents

	Page
Preface .....	ii
List of Figures .....	v
Abstract.....	vi
I. Introduction .....	1
General Issue .....	1
Background .....	2
Problem Statement.....	5
Research Objectives .....	5
Investigative Questions .....	6
II. Literature Review .....	7
Chapter Summary.....	14
III. Methodology .....	16
Chapter Overview .....	16
Contractor System Descriptions .....	17
Individual Interviews .....	18
Chapter Summary.....	19
IV. Analysis.....	20
Chapter Overview .....	20
Contractor System Descriptions .....	20
Individual Interviews .....	25
Chapter Summary.....	42
V. Conclusions and Recommendations.....	44
Contractor System Descriptions .....	44
Individual Interviews .....	44
Recommendations .....	46

	Page
Appendix A: Definitions .....	48
Appendix B: Interview Questions .....	49
Bibliography .....	50
Vita .....	51

## **List of Figures**

Figure	Page
1. Methodology for estimating management reserve using the 'top-down' method.....	3
2. Methodology for estimating management reserve using the 'bottom-up' method.....	4
3. Methodology for estimating management reserve using the 'combination' method.....	5
4. Methodology for analyzing the purpose and development of management reserve budget.....	16



### **Abstract**

This study investigates both the purpose and development of management reserve budget as it pertains to the Cost/Schedule Control Systems Criteria outlined in DoD Instruction 5000.2. With the Defense Department facing an environment of shrinking budgets, it is becoming increasingly critical for them to manage their acquisition programs as efficient and effective as possible. The objectives of this study were to gain insight, from both a government and commercial perspective, on both the purpose and the development of the contractor's management reserve budget.

Contractor system descriptions and interviews of individuals associated with the government acquisition process were used to document and analyze the objectives of the study. The contractor system descriptions and personal interviews both provided detailed information on the purpose of the contractor's management reserve budget. However, neither data source provided a consistent, objective methodology for developing an accurate and comprehensive contractor's management reserve budget.

***AN ANALYSIS OF THE PURPOSE AND DEVELOPMENT OF  
MANAGEMENT RESERVE***

**I. Introduction**

**General Issue**

The Department of Defense (DoD) is faced with an environment of shrinking budgets making it necessary to allocate and spend all resource funding as efficiently and effectively as possible. A large portion of the DoD's budget goes toward acquiring new systems. According to the US Government's fiscal year 1993 budget, it was estimated \$98 billion would be budgeted for procurement, research and development, and test and evaluation (1:Appendix Two-23). These systems have cost estimates that were submitted by the bidding contractors. The cost estimates are the estimated costs required to produce a specific quantity of items or systems at a specific quality level. It is the responsibility of the government project management and the contractor project management to ensure cost estimates are consistent and accurate.

An important step for managing program costs is implementing proper budgeting procedures. The DoD implemented DoD Instruction 7000.2, later changed to DoDI 5000.2 which contains Cost/Schedule Control Systems Criteria (C/SCSC), to insure that contractor's management control methods and procedures were efficient and would result in the availability of data and information suitable for decision making purposes.

The criteria were never expected to eliminate cost overruns or schedule slippage, as some individuals have mistakenly suggested. They were, however, expected to provide a tool to the procuring agencies, with which they could better estimate the total costs and the total duration of planned or existing programs. (5:30)

There are thirty-five criteria that contractor management systems must meet. This research proposes to address the issues associated with a segment of the 10th criterion in the Planning and Budgeting section of 5000.2: "Identify management reserves and undistributed budget".

## **Background**

Given the difficulty in estimating the contract cost, C/SCSC allows the contractor to budget a management reserve (MR) into the program after contract award. The management reserve budget is held in a reserve account controlled by the contractor project manager and is intended for management control purposes rather than designated for the accomplishment of a specific task or set of tasks (3:2-2).

In most major acquisition contracts, particularly in the development phase, there is considerable uncertainty regarding the timing, contractor work breakdown structure (CWBS) elements involved, or magnitude of future difficulties. The C/SCSC permit the use of a management reserve provided that adequate identification and controls are maintained . . . management reserve is not a contingency which can be eliminated from contract prices during subsequent negotiations or used to absorb the cost of contract changes. The contractor should not be required to provide funds for authorized but undefinitized work or other modifications to authorized contractual efforts. The contractor may, if the documented management system permits, use management reserve to provide temporary budgets for authorized undefinitized effort . . . Definitization of contract changes may result in establishing a new level of management reserve reflecting the revised effort. This new level may exceed prior reserves. (3:3-10)

An initial budget must be developed before the management reserve budget can be identified. The initial budget needs to be divided between a management reserve and a performance measurement baseline (PMB) (10:100). The PMB is the time phased budget

budget (TAB) less management reserve. It has been proposed that there are two reasons to budget a management reserve. The first is to provide incentives to the functional managers to do their jobs as efficiently as possible. The second use of management reserve is as a contingency budget, to provide an adequate budget for in-scope, unanticipated performance requirements that will impact the future effort. (5:49)

In theory, there are three ways to develop the management reserve budget: non-participative, participative, or some combination of the two. The non-participative development of the management reserve is budgeted by upper management. This is done by initially setting aside a percentage of the TAB to cover future contingencies. This is also known as the top-down approach.

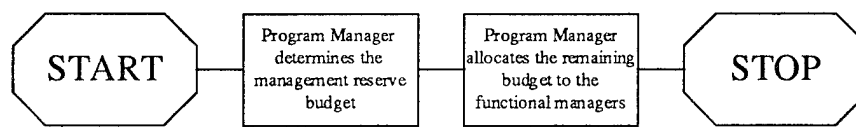


Figure 1. Methodology for estimating management reserve using the 'top-down' method.

The participative budget development of the management reserve is accomplished at lower echelons of the contract work breakdown structures. This is done by budgeting in the contract budget base for what is exactly needed in order to complete the contract. This includes a management reserve budget necessary to cover contingencies that arise during the project. The excess budget that remains once the PMB requirements are satisfied is then established as management reserve. Participative development is also known as bottom-up approach.

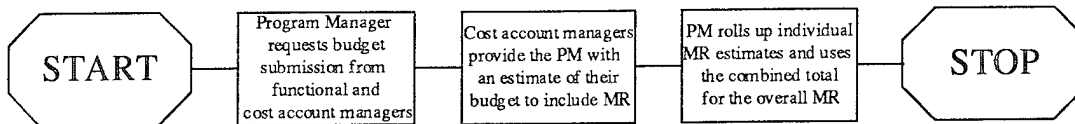


Figure 2. Methodology for estimating management reserve using the 'bottom-up' method.

For the purpose of this study, I am assuming that a non-participative budget development of the management reserve would be used by a contractor whose management perceived management reserve to be budgeted for contingencies; whereas, participative development would be used by a contractor whose management perceived the management reserve as an incentive to complete the contract within budget. Conceivably, there could be a combination of the two. A combination approach would entail tighter control on some CWBS resulting in non-participative development, while other CWBSs would be given the opportunity of a participative development.

The need for controls over any particular behavior or operation within an organization depends very simply on the impact of that area on overall organizational performance. Thus, more control should be exercised over a strategically important behavior rather than over a minor one, regardless of how easy it is to control each. (7:48)

It could also entail a scenario in which upper and lower management negotiate towards a mutually agreeable management reserve budget. In this case, an initial management reserve budget estimate would be proposed by the Program Manager. Cost account managers would individually negotiate and justify any increase in management reserve budget they required to complete their task.

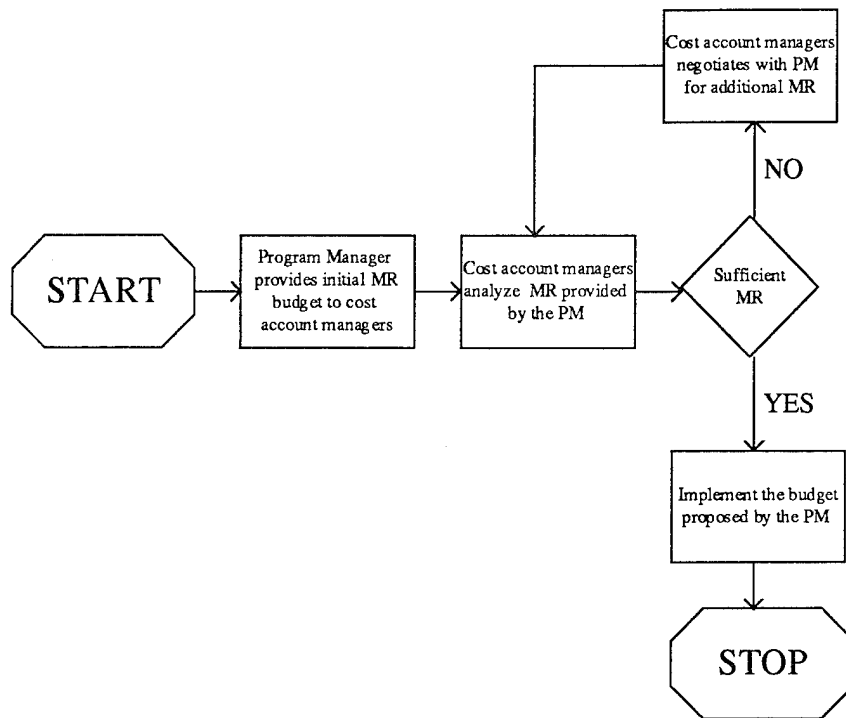


Figure 3. Methodology for estimating management reserve using the 'combination' method.

### Problem Statement

The Department of Defense expects the government contractors to stay within budget. Little research has been done in the area of management reserve. The purpose of this thesis was to determine the purpose and development of the management reserve budget. Determining the purpose and development of the management reserve budget was accomplished by reviewing selected contractor cost/schedule control system descriptions and conducting interviews.

### Research Objectives

An attempt to better understand and address management reserve is made by examining its purpose and development. The purpose of this research is to conduct an

examination of the purpose and development of management reserve. The goal of this research is to gain an understanding of the effects one has on the other.

### **Investigative Questions**

1. What is management reserve budget?
2. What is the purpose of management reserve budget?
  - a. Is management reserve budget used for in-scope contingencies?
  - b. Is management reserve budget used as an incentive?
3. How is management reserve budget developed?
  - a. What factors influence the development of management reserve budget?

The following chapter provides a summary of the current literature in the area of management reserve/budgetary slack. Chapter Three details the methodology used in the research. Chapter Four presents the results of the research. The final chapter provides conclusions to the conducted research and recommendations emanating from the research results/analysis.

## **II. Literature Review**

A literature review of MR and budgetary slack produced only a few sources on MR, but numerous more on budgetary slack. Two books that discussed cost schedule control systems in detail were reviewed. The books were, The Principles and Practice of Cost Schedule Control Systems by Chuck Slemaker and Cost/Schedule Control Systems Criteria by Quentin Fleming. Both of these books covered MR from a government perspective, and outlined the 35 standards with respect to C/SCSC which are mandated by DoD 5000.2M. Another book, Rewarding Results by Kenneth Merchant, covered budgetary slack from a corporate perspective. Merchant's book focused on budgetary slack, which is synonymous with MR, and its effects on those who formulate the organization's budget. Unlike the aforementioned books that discussed MR, Merchant's book was the result of a comprehensive survey in which numerous corporations' profit center managers were interviewed. Finally, selected journal articles focusing on budgeting and budgetary slack were reviewed. This provided a broad, well documented perspective on the topic.

Cost/Schedule Control Systems Criteria The Management Guide to C/SCSC by Fleming is a comprehensive analysis of C/SCSC. In a matter of fact way, Fleming systematically described the need and importance of C/SCSC. The book gave detailed analysis of the 35 criteria. It defined and explained the purpose and relevance of each individual criteria by function. The book continued on to illustrate how one would implement C/SCSC into their own program. This included the development of the work breakdown structure, the C/SCSC baseline, as well as the validation process. The book



concluded by addressing special topics including reporting and analyzing the C/SCSC data.

Relating specifically to the management reserve budget, Fleming addressed the purpose of the management reserve budget, however, he did not address the development of the management reserve budget. Fleming suggested two reasons for the purpose of the management reserve budget. First, to provide incentives to lower management to perform their jobs as efficiently as possible and second to provide a contingency fund for unanticipated program requirements (5: 49).

Like Fleming, Slemaker's The Principles and Practice of Cost/Schedule Control Systems was an informative, comprehensive look at C/SCSC. Slemaker provided a step-by-step procedure for developing and implementing a cost/schedule control system that is tailored to your specific situation. He was much more technical in nature and provided detailed examples to explain the relevant concepts. Slemaker presented the nuts and bolts of analyzing the control system's critical indicators. Specifically, he addressed both cost and schedule variances, as well as numerous indices measuring both cost and schedule performances. This format would be particularly helpful for those who were new to the concepts, but had the technical knowledge to follow along.

Slemaker stated that the management reserve budget was to be used for those inevitable, unforeseen tasks that are in scope but not previously budgeted and to provide the program manager with a means to protect his target profit (10: 100). Slemaker also claimed that management reserve budget could be used to periodically revise the estimated cost of the program at the completion of the program (10: 351). The development of the management reserve budget is accomplished by the program manager assessing the cost, schedule, and technical uncertainty in the project (10: 100). Slemaker did not provide a systematic, step-by-step methodology for establishing the management reserve budget.

He indicated that the management reserve budget was typically 5 to 10 percent of the total budget.

Rewarding Results was much different than the two previous books yet in some ways the same. It was the same in that Rewarding Results discussed the importance and relevance of cost/schedule control systems. The difference was the way Merchant went about it. Merchant focused entirely on the commercial industry as opposed to government industry. The book was more of a study of how control systems are applied through motivational contracts. This was accomplished with a survey. The survey was administered to twelve different corporations both small and large and both manufacturing and service oriented. Within each firm the survey was distributed to four different profit centers. The purpose of designing the survey this way was to study how the control systems varied across profits centers within each corporation as well as how they varied across corporations (9: 231).

The main focus of the study was the motivational contracts of the corporations. The purpose of motivational contracts is to reward profit center managers who display outstanding performance. The profit center managers are motivated to generate higher results only when they are rewarded for that performance (9: 197). There are four basic types of motivational contracts: 1) threats of penalties for missing short-term profit budget targets; 2) promises of incentive compensation for annual performance; 3) written promises of rewards for long-term performance; and 4) unwritten promises of rewards for long-term performance (9: 29). Merchant compared and contrasted the motivational contracts between the different profit centers and the results showed situation factors are usually responsible for contract differences between corporations (9: 223). "In changing environments, failure to adapt contracts to new situational factors may mean that the contracts that are being used are becoming less and less appropriate. To respond

appropriately, corporate managers must recognize changes in relevant factors and know about the contract alternatives and their effects” (9: 226).

The book investigated the purpose of management reserve or budgetary slack. It determined that budgetary slack provided the manager with the ability to increase their profits, enhance their operating flexibility and protect their freedom to act independently (9: 154). The book does not explain how the budgetary slack or ‘highly achievable budget targets’ are established.

The first article reviewed was “Participative Budgeting and Managerial Performance” by Peter Chalos and Susan Haka. Their study examined two hypotheses: 1) firm and manager performance will significantly increase in both favorable and unfavorable states of nature (good news and bad news) with budget participation; and 2) when information is unfavorable, a participative budget process will increase firm and manager returns significantly, while an imposed budget will decrease firm and manager returns significantly; when information is favorable, participative budget process will decrease firm and manager returns significantly, while an imposed budget will increase firm and manager returns significantly.

The hypotheses were tested by experiment. The experiment consisted of establishing superior-subordinate relationships and testing the ability of the pair to select specific performance standards to be decoded based on: 1) an imposed treatment on the subordinate or 2) a participative treatment, where the superior and subordinate negotiated performance standards to be decoded. The results of the study indicated that both firm and manager returns increased significantly with budget negotiation or participative budgeting. In cases with bad news, participation significantly improved manager and, to a lesser extent, firm returns (2: 343).

The results of the above study indicated that subordinate participation in the budget process increased the returns of both the firm and the manager. From this one could conclude that the development of management reserve budget could be improved by including and expanding participatory budgeting into the management reserve budget process. Including cost account managers in the budget process could increase the accuracy and volume of information necessary to establish a credible management reserve budget.

“Control System Effects On Budget Slack” by Leslie Kren investigated the effects of control system characteristics and their propensity to create budgetary slack. In 1970 Schiff and Lewin found that budget slack is usually evident as overstated expenses, understated revenues, or underestimated performance capabilities. Kren stated that budget slack can also be created at the organizational level for strategic purposes. Kren examined the hypothesis that budget slack is negatively related to the organization’s monitoring ability (as determined by control system characteristics). That is, as monitoring ability increases budget slack decreases. To test the hypothesis a questionnaire survey was distributed to 192 executive-level profit center managers from 96 companies. The results of the study proved the hypothesis to true. The following conclusion is provided:

Managers acquire private information (information that is unavailable to their superiors) because they are closer to the decision environment than their superiors. Such information asymmetries create a significant control problem for the organization because it may provide the means for managers to shirk more effectively or to pursue personal goals that may otherwise be disapproved. Moreover if budgeting managers use their private information as the basis for budget slack, it hinders planning efforts, coordination of business activities, and realistic appraisal of managerial performance...The availability of information about the

performance capability of the budgeting manager through the organizational control system, however, appears to reduce the propensity to create slack. For the companies in this sample, greater investments in information and control systems paid off in significant reductions in the propensity to create budget slack. (6: 115)

The development of the management reserve budget could possibly be improved by implementing additional control systems. Increased supervision of the budget process could serve as a vehicle to authenticate the accuracy and completeness of the proposed budgets. The accuracy of the management reserve budget should also improve the performance of the firm by reducing unnecessary or imaginary expenses that would have otherwise gone undetected without the increased supervision.

“Budgeting And The Propensity To Create Budgetary Slack” by Kenneth Merchant focused on how the budgeting system affects managers’ propensity to create budgetary slack. Budgetary slack can be defined as the excess budget amount in an area over that which is necessary (8: 201). Merchant refers to a study done by Onsi in 1973, in which he found a positive relationship between managers’ need to create budgetary slack and a closely monitored budgetary control system. He also found that when managers actively participated in the budgeting process they had less need to create budgetary slack (8: 202). Merchant conducted a survey in 19 organizations in the electronics industry. Interviews were conducted with managers at the highest and lowest levels of the organization that was involved in budgeting and questionnaires measuring budget behaviors and attitudes were distributed to 201 manufacturing managers. Unlike the study done by Onsi, Merchant focused on managers in one functional area, manufacturing. The study provides the following results: 1) managers’ propensity to create slack vary with the

setting; 2) propensities to create slack do not appear to increase with the imposition of a formal budget process; 3) the propensity to create slack appears to increase if a tight budget requires the managers to reallocate budget targets as not to incur budget overruns; 4) active participation in the budget process seems to reduce the propensity to create slack.

This article also suggested the process of developing a management reserve budget could be improved by increasing participation in the budgetary process. By increasing the personnel involved in developing the budget, additional information should become available to improve both the accuracy and completeness of the budget estimate.

“The Control Function of Management,” also by Merchant, discusses the importance and relevance of the control function of management. Specifically, Merchant attempts to answer four broader questions: 1) Why are controls needed?; 2) What is good control?; 3) How can good control be achieved?; and 4) How do you choose among the feasible options?

Controls are needed because sometimes individuals are unable or unwilling to act in the organization’s best interest, and as a result a set of controls must be implemented to guard against undesirable behavior and to encourage desirable behavior. There are times when individuals do not understand what is expected of them or they do not have the necessary capability, training, or information that is required for them to act in the organization’s best interest (7: 43). While others have the required skills to perform their job adequately, they choose not to because their goals differ from those of the organization.

Merchant identifies four important characteristics for good control: 1) it must be future-oriented: no unpleasant surprises in the future; 2) control must have a single objective unless performance on every significant dimension has been considered; 3)

assessment as to the achievement of good control is difficult; and 4) better control is not always economically feasible. To achieve good control Merchant suggests avoiding control-problems, control of specific actions, control of results, and control of personnel.. Avoidance can be accomplished through automation, centralization, risk-sharing with an outside body, and by elimination of an operation entirely. Specific action includes physical constraints such as locks, segregation of duties which hampers an individuals ability to perform an undesirable act and holding employees accountable for their actions (7: 45).

Choosing from multiple feasible options is done only after careful consideration and weighting of: 1) the total need for control; 2) the amount of control that can be designed into each control device; and 3) the cost of each (7: 48).

The development of a functional management reserve budget relies on the information that is significant and accurate in nature. Significant and accurate information is obtained by increasing the firm's control over the budgetary process. Once control over the budgetary process is established and maintained the organization is able to ensure individual influences are minimized.

## **Chapter Summary**

Based on the information gathered and reviewed by reading this literature I have identified two issues which appear to be significant factors in the development and usage of MR. These issues are: management control of the budgetary process and participation in the budgetary process. These two items were identified as issues due to their capability to significantly impact the organization's ability to develop an accurate and complete management reserve budget. The organization's ability to control who and to what extent individuals participate in the budget process is the key to developing a credible management reserve budget.

There does not appear to be any confusion about the purpose of the management reserve budget. In each source identified above there was a clear understanding as to the purpose of the management reserve budget. However, things were not as obvious when it came to comprehending who should develop the management reserve budget and precisely how they should develop it. A quantifiable methodology was not presented in the literature reviewed. They did not provide a method to calculate a specific amount of budget based on a specific amount of risk. However, there was an attempt to provide a quantifiable approach in developing a relevant management reserve budget. It was apparent that there was overwhelming agreement amongst the identified sources. There was a consensus that the quality of the management reserve budget development was dependent on the amount of participation involved in the initial budget process and the control management had over that participation. Specifically, as subordinate participation increased in the budgetary process increased the quality of the management reserve budget also increase. Additionally, there was evidence of correlation between the amount of management control over the budget process and the correctness of the resulting budget. To improve the development process of the management reserve budget it would be appropriate to increase both the management control and subordinate participation in the budgetary process.



### III. Methodology

#### Chapter Overview

The objective of this research is to examine the purpose and development of the management reserve budget for government contracts. This chapter outlines the method of analysis used to conduct the research. The research consisted of two parts. The first part consisted of reviewing a sample of contractor system descriptions. The second part consisted of interviewing ten individuals who had experience with the C/SCSC discipline.

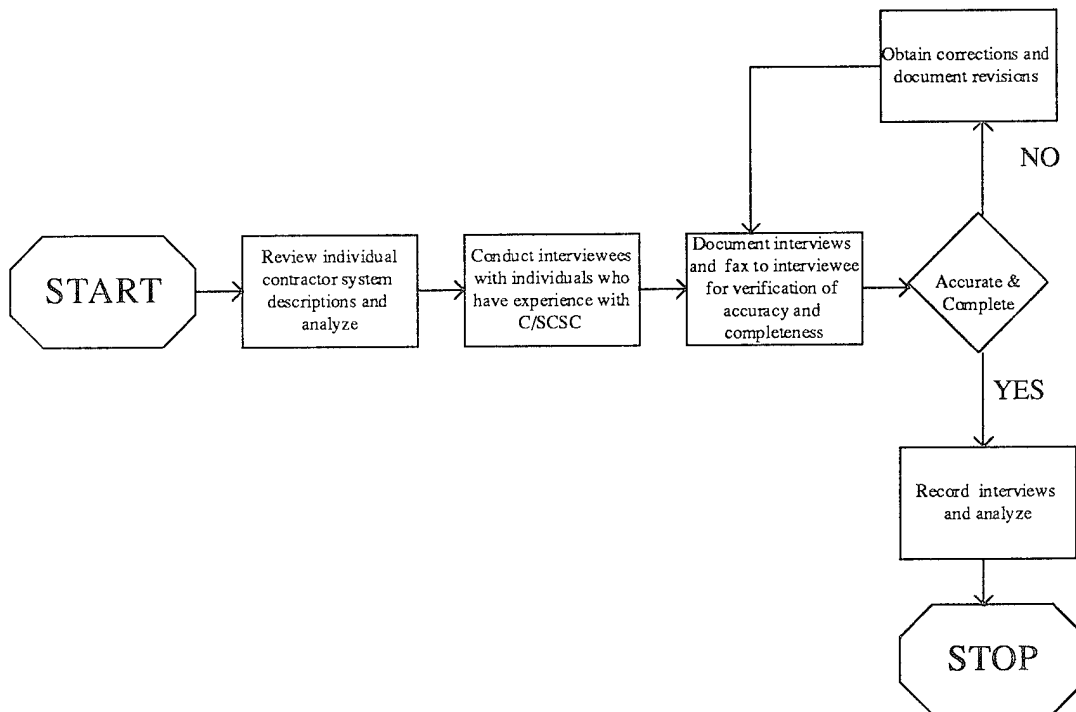


Figure 4. Methodology for analyzing the purpose and development of management reserve budget.

## **Contractor System Descriptions**

A sample of five contractor system descriptions was used to obtain the relevant information necessary to complete the research. The contractor system description describes the contractors' management systems which are intended to comply or satisfy the interest of the criterion. It is a contractor-specific document that outlines the management control system that will track and report cost and schedule progress and deficiencies. The system description is comprised of management control subsystems designed to assure the disciplined management of all contractually authorized tasks on applicable programs. It establishes formal methodologies for organizing, planning, and controlling program work within cost, schedule, and performance constraints. Furthermore, it is designed to comply with the Cost/Schedule Control Systems Criteria outlined in DoD 5000.2 (12:1-1).

Each system description was thoroughly reviewed. The entire system description was reviewed to get an overall perspective on the document; however, only the sections pertaining to management reserve budget purpose and development were analyzed and documented in this study.

Once all the system descriptions had been reviewed, a comparison of the system descriptions was performed. Specifically, the methods and procedures used by a particular contractor to develop the management reserve budget were compared and contrasted to the other contractor's methods and procedures. This was accomplished by concentrating on the organization section and the planning and budgeting section of the contractor's cost/schedule control system documents. The organization section generally explained the management control system development and how the system operated between and within levels of the organization. The organization section also defined the functional duties and responsibilities of the affected departments. The budgeting and planning section defined the responsible parties for formulating, approving, and authorizing both

the budgeting and planning of the contract work breakdown structures. Budgeting was defined as both direct and indirect budgeting, to include performance measurement baseline as well as MR and undistributed budget.

For purposes of anonymity, the system descriptions will be identified as Companies A, B, C, D, and E in chapters four and five of this project.

### **Individual Interviews**

A list of interview candidates with management reserve budget experience was developed. The candidates consisted of individuals with diverse levels of experience and backgrounds with regards to management reserve budget. Experience levels ranged from a couple of years to over twenty years of experience in the C/SCSC discipline.

Backgrounds of the individuals ranged from DoD policy and operations level government employees to various functional management contractor employees. By interviewing a wide spectrum of individuals the goal was to obtain a broad perspective of the topic.

Next, several questions concerning both the purpose and the development of the management reserve budget were drafted. These questions may be found in Appendix B. There were a total of seven questions. The first question addressed what exactly is management reserve. Questions 2 and 3 addressed the purpose of management reserve. Questions 4 through 7 addressed how management reserve is developed.

After the questions were developed, each of the candidates was contacted. Of the 13 possible candidates ten were available to participate in the research project. Before anyone was interviewed, the participants were faxed a copy of the questions. This was done to allow them the opportunity to think about the questions before answering them. Individuals that were in the local area were interviewed in person. Individuals that were not in the local area were interviewed by phone. In either case, the results of the interviews were typed up in question answer format and faxed to the interviewee to

review for both accuracy and completeness. This avoided any miscommunication or misinterpretation on the part of the interviewer. The interviewee was contacted once more to ensure receipt of the interview results and to ensure there were no further comments. The written interviews may be found in Appendix 3.

For purposes of anonymity, individuals interviewed for this project will be referred to as numbers and not by name in chapters four and five of this project. For example, the first person interviewed will be Interviewee #1.

## **Chapter Summary**

The purpose of comparing and contrasting the individual descriptions is to identify if there is a correlation between the purpose of management reserve and how management reserve is developed. The interviews were conducted with the intentions of comparing written guidelines to the perceived purpose of management reserve and how management reserve is actually developed by those who are involved with management reserve budget on a day to day basis. This concludes the methodology chapter. The next chapter presents the analysis of both the contractor system descriptions and the individual interviews and possible relationships between the two.

## **IV. Analysis**

### **Chapter Overview**

This chapter analyzed the five contractor system descriptions that were reviewed and the ten individual interviews that were conducted for this research. The chapter is divided into two sections. The first section documents and analyzes the contractor system descriptions and the second section documents and analyzes the individual interviews.

### **Contractor System Descriptions**

Five contractor system descriptions were reviewed and analyzed. The following is a brief background on each of the contractors. All of the contractor system descriptions reviewed were from large defense oriented contractors. The Company A system description represents the electronics division of an aircraft manufacturer. The Company B system description represents a defense contractor that specializes in communications technology. This particular system description for Company B is representative of their electronics group. The Company C system description represents the cost/schedule control system of one specific aircraft within an aircraft manufacturer. The Company D system description represents defense contractor that specializes in a wide spectrum of technologies. This particular system description is a generic system description that can be applied to any of their divisions or groups. The Company E system description represents a defense contractor that specializes in electronic and electromechanical devices with both military and commercial applications.

In reviewing the contractor system descriptions the focus was to answer the investigative questions stated in the methodology chapter of the research. The investigative questions will be addressed in the order they were presented.

QUESTION #1 - What is management reserve?

Company A: "A portion of the total contract used for management control of future uncertainties such as timing, CWBS elements involved and magnitude of future difficulties, provide for company profit objectives, establish incentives for functional managers and to hold labor and burden rate/factor deltas for out-year budgets."

Company B: "An amount of the Total Allocated Budget withheld for management control purposes rather than designated for accomplishing a specific task or set of tasks."

Company C: "Management Reserve is a contingency budget withheld from the Contract Budget Base to be used for budgeting unanticipated and unplanned tasks that are within the scope of the contract statement of work."

Company D: "An amount of the contract value withheld for management control purposes rather than for the accomplishment of specific effort."

Company E: "An amount of the Total Allocated Budget (TAB) withheld for management control purposes rather than designated for the accomplishment of a specific task or set of tasks."

Assessment: Although their choices of words were different, each of the companies provided a definition of management reserve similar to or exactly the same as that given in the Cost/Schedule Control Systems Criteria Joint Implementation Guide. The definitions were short and to the point. There was consistency. The companies defined management reserve as a part of the total budget set aside for management control purposes. It is apparent that each of the companies has a concrete understanding of the purpose of the management reserve budget.

QUESTION #2 - What is the purpose of management reserve?

Company A: "Management Reserve may be used to temporarily fund authorized, non-negotiated effort including change proposal preparation activity for which a target memo has not been issued. Management Reserve will not be used to cover cost overruns nor will cost underruns, due to performance, be transferred to Management Reserve."

Company B: "Management Reserve is established to account for the uncertainties encountered in development engineering. It may be distributed to cost accounts to cover extensive changes such as a design change that is outside the original plan or slight (less than \$1000) changes due to more precise planning."

Company C: "The purpose of management reserve is to have available a source of budget to be applied by the program manager to unforeseen problems that are within the scope of the contract, but are out of scope of work assigned to cost accounts."

Company D: "Management reserve is authorized for future effort that is within the scope of the contract, but unknown when the contract was awarded."

Company E: "The Program Manager will use and administer the Management Reserve to maintain a capability to budget and authorize contractual in-scope effort that was overlooked, unknown, or has changed significantly since budget plans were established. The Management Reserve will not be used to fund cost overruns."

Assessment: Each of the companies provided a short narrative as to the purpose of the management reserve budget. Among these companies there appeared to be a less than full understanding of the purpose of the management reserve budget. Every one of the companies provided short narrative of the purpose of management reserve as they understood it. Some of the descriptions were vague and incomplete. The reader would obtain a better understanding of the purpose of management reserve if each company provided a more comprehensive description of the purpose of management reserve. This could be accomplished by providing specific examples and scenarios for when and why management reserve budget would and would not be used.

### QUESTION #3 - How is management reserve developed?

Company A: "Management reserve is developed by the Program Management. The Program Management will "hold back" a portion of the total contract budget. The remaining budget is then allocated amongst the functional managers. The functional managers may also "hold back" a portion of their allocated budget as a management reserve before distributing the remaining budget to their cost account managers. The cost account managers are not allowed to maintain a management reserve. If either the cost account manager or the functional manager disagrees with their respective budget they

may document the differences and negotiate with their respective superiors. The system description does not specifically address how a particular dollar amount for management reserve is developed.”

Company B: “A tentative goal for management reserve is normally established at the beginning of the program by the program manager. As cost account budgets are formalized and negotiated with the cost account managers, the amount of management reserve is refined.”

Company C: “The management reserve is developed by the program office. The program office assesses the risks in the program and establishes an appropriate management reserve. Once the initial management reserve budget is established, target budget and schedules are established by the program manager for each function and are communicated to the appropriate function on a Budget Advice prepared by the program controller. Upon receipt of the budget document, the functional vice president and the manager report directly to the program manager to review the work scope and budget targets. Any concerns about the work scope and/or budget are reviewed with the program office. Acceptance of the budget document is signified by the functional department’s vice president and his direct reports signing the budget document.”

“The functional vice president then assigns target budgets and work assignments by cost accounts. The cost account with the assistance of the functional planner/scheduler, develops the detail plans for each cost account. Cost account plans are reviewed and approved by the concerned functional manager, functional scheduler, and functional controller before work is authorized to begin. If the results of the planning do not correspond to the targets provided in the budget document, the cost account manager may negotiate, as appropriate, with his functional manager or the program office and/or replan the cost account to meet the agreed upon targets. If through negotiation a cost account is replanned then the management reserve is adjusted accordingly.”

Company D: “Management reserve is established for negotiated work and after all planned work has been fully budgeted and authorized via a master operating budget.”

Company E: “After receipt of a contract, the Program Manager establishes and separately identifies a Management Reserve. The process of establishing this controlled Management Reserve is required when a risk analysis indicates its need and/or when negotiated internal work plans allow for program dollars to be held in reserve. This establishment of a Management Reserve is initially performed by the Program Manager and will be the only reserve on the program. The Program Manager, with the assistance of responsible Charge Number Manager’s, assesses the technical, schedule and cost risk compared with their current available and required resources to do the work. The Program Manager’s judgment of reasonableness establishes the amount of reserves.”



Assessment: A rough outline as to how the management reserve budget is developed was provided by each company. Two of the companies used some type of risk analysis to determine their management reserve budget. However, neither of these companies provided the detailed methodology required to calculate a specific amount of management reserve budget required for a specific amount of risk. A detailed methodology of how they actually developed their methodology would be extremely beneficial. Company C provided the most thorough outline to their methodology. They appeared to develop their management reserve through a combination of a top-down and bottom-up approach. The Program Manager established the initial budget, but allowed for input and negotiation from the cost account managers once they had received their initial budget. What was not clear was how the Program Manager determined the initial budget. There was mention of an assessment of risk, but it did not continue on to explain how the assessment was actually performed.

Overall Assessment: The system descriptions provided a formal standardized format for documenting a process required to track and analyze C/SCSC requirements. There was a clear understanding of the purpose of the management reserve budget. In each case, the contractor clearly and accurately stated their understanding of the purpose of the management reserve budget. Unfortunately, there was not a clear interpretation of how the management reserve budget should be developed to ensure an accurate and complete depiction of the situation. Some system descriptions provided general a methodology capable of establishing a less than perfect estimate at best. And still other system descriptions provided no documentation on establishing a relevant management reserve budget.

## Individual Interviews

Ten individuals were interviewed about the purpose and the development of the management reserve budget. The interviewees consisted of individuals with diverse levels of experience and backgrounds with regards to the C/SCSC discipline. Experience levels of the interviewees ranged from a couple of years to over twenty years. Backgrounds of the interviewees varied from DoD policy and operations level government employees to various functional management contractor employees.

The following is a question answer format. It is formatted by question. The analyses of the interviewees' responses follows each question-answer section.

### 1. What is management reserve budget?

Interviewee #1: It is a part of the contract target that is used to establish budgets for known unknowns. It is also used to budget for unknown unknowns, but primarily known unknowns.

Interviewee #2: It is funding set aside by the program manager for uncertainties such as a change in burden rates and for items you don't know that you will have to do.

Interviewee #3: Management reserve budget is supposed to be an amount of the contract budget base set aside by the contractor for unknown unknowns.

Interviewee #4: Management reserve budget is simply a budget set a side by the contractor program manager for in-scope contingencies. Areas that you are unable to anticipate that could be potentially at risk.

Interviewee #5: When talking about management reserve it is important to differentiate between the contractor management reserve and the government management reserve. The government management reserve, which is usually managed by the program executive officer or the program manager, is used for program contingencies. A contingency is additional work that is outside the scope of the particular contract but still within the authorized program. The contractor management reserve is managed by the contractor program manager and spent by the functional support managers. It is the portion of the contract budget that the contractor owns to fund for "bad things that can happen" to the program, but are still inside the scope of the contract.

Interviewee #6: Management reserve is not just here for a budget overrun. It is funding that is deducted from the total negotiated contract and used for unknown unknowns.

Interviewee #7: Management reserve budget is simply the amount of budget a contractor chooses, using their own methodology, to set aside as a reserve. The controls and processes of management reserve are defined by the contractor. One needs to be concerned about where management reserve comes from. The contractor gets a negotiated budget: the contract budget base (CBB). The CBB is then broken into the two parts. The performance measurement baseline (PMB) and management reserve. A major assumption involved with the criteria is the CBB is a realistic budget. This is patently untrue. Experience through 1980-1986 saw the expansion of the defense budget during the Reagan administration. The growing Service requirements lists were under budget with respect to time and money. However, there were exceptions. On occasion the services asked for more money than needed and passed it along to the contractor. This padded the contractor's baseline (this is the exception and depends on the priority given to the program by the service, DoD, and congress).

Interviewee #8: A general description of management reserve is a budget of funding set aside by management to cover any unplanned events during the course of the contract. However, management reserve budget is not used to cover cost overruns.

Interviewee #9: A portion of the contract budget set aside to handle unknown unknowns and to provide management flexibility in the execution of the contract. (According to the Joint Implementation Guide (JIG) it is "an amount of the total allocated budget withheld for management control purposes rather than designated for the accomplishment of a specific task or set of tasks".)

Interviewee #10: A contractor contingency fund/risk fund. It is a budget that is set aside to cover unknown unknowns.

Assessment: The ten individuals interviewed all agreed that the management reserve budget was a portion of the contract budget base set aside for unknowns. However, some interviewees said the management reserve was budgeted for known unknowns, while others said the management reserve was budgeted for unknown unknowns, and still others stated the management reserve was budgeted for both known and unknown unknowns. Without a firm definition of known unknown and unknown unknown, it was difficult to comprehend the distinction between the two terms.

Interviewee #5 made an important observation. When talking about management reserve, it is critical to make the distinction between the contractor's management reserve

and the government's management reserve. The two are very different. According to interviewee #5, the contractor's management reserve budget is managed and controlled by the contractor, usually the Program Manager, and is used for a specific contract. The government's management reserve budget is managed by the government and can be depleted by a number of different contracts.

2. Is management reserve budget developed for in-scope contingencies? Please explain.

Interviewee #1: Yes. This is exactly what I referred to as known unknowns. However, it is important to note that you should be careful with the word contingency. Contingency in the literal sense is not a valid use of management reserve.

Interviewee #2: Yes. For example, suppose you require a 100 hour test in a constant 100 hour test and evaluation. However, 50 hours through the test there is an interruption in the test. Now the test must be started over from the beginning. This could significantly effect the cost of the program. Or it could be something you forgot to budget for, but still in-scope. Anything to get the project completed that they didn't budget for.

Interviewee #3: Yes. This is part of it. The government will not negotiate a contract which includes probabilities of tasks happening. They will only negotiate a contract to include tasks the contractor knows will happen. Some contractors therefore pump up overhead requirements, test assets or other known but soft support type tasks in order to build in a management reserve. Through contract negotiation the two parties settle on a "fair and reasonable" cost to do the identified work.

Interviewee #4: Yes. Management reserve budget is developed for in-scope contingencies with respect to the contract, but out of scope with respect to the cost account manager (CAM) or functional manager.

Interviewee #5: Yes. Anything outside the scope of the contract suggests additional funding. Management reserve is to cover in-scope work only.

Interviewee #6: Yes. Types of contingencies in which work was more difficult than originally planned. For example, schedule could be affected by different contingencies such as a fire, a storm, or government furnished equipment.

Interviewee #7: My immediate response is no. You don't develop a management reserve budget. Contingencies are described as unknown unknowns. It is difficult to plan for unknowns. Risk analysis can be used. A group of financial managers is assigned to

support the contract. This group runs the C/SCSC program for the contract and interacts with the program office or program manager. They recommend the amount of management reserve required based on what they think they can squeeze out of the cost account managers. As a result you have a challenge budget.

Interviewee #8: Yes. Management reserve must be used for unplanned in-scope tasks within the contract statement of work. Take for example an engine test. The engine is assembled and then tested. Sometimes during engine test the engine may experience a failure. There is no way to plan for the failure. There is no budget within the work breakdown structure for dealing with the failure. This is where the management reserve comes into the picture. The management reserve provides budget to complete the unplanned tasks necessary to continue testing of the engine.

Interviewee #9: Management reserve is specifically to provide budget for in-scope unanticipated work or tasks. Work that is not within the scope of the contract must be covered by a contract change. Management reserve is not for "contingencies" since contracts negotiated by DoD contracting officers must not include allowances for "contingencies". The planned contract budget (negotiated price less fee or profit) is decreased by the amount set aside for management reserve and the remaining budget is allocated to contract work tasks which, when time-phased, constitute the performance measurement baseline.

Interviewee #10: Yes. In-scope in that management reserve is created from in-scope effort and that is what the management reserve is for. If there is additional effort, then management reserve must be recalculated.

Assessment: This question was confusing for some of the interviewees. Some of the interviewees pointed out that the management reserve was not to be used for contingencies. While others made no remark of the discrepancy.

Nine of the ten interviewees agreed that the management reserve should be developed for in-scope contingencies. Interviewee #7 had some concerns about this question. The interviewee felt that a "challenge budget" should be developed and not a management reserve budget. Any budget remaining after establishing the challenge budgets would then become available for the management reserve budget. Overall, the consensus was that management reserve budget should be used for in-scope tasks; tasks

identified and negotiated in the original contract. Management reserve budget used for any tasks outside the scope of the contract would be illegal.

3. Is management reserve budget developed for use as an incentive? Please explain.

Interviewee #1: Yes. It is an instrument that can be used to challenge the functional manager to complete their task at a reduced level of their original estimate. This challenge budgeting provides a link between management reserve and risk management planning. Practice has been to develop management reserve arbitrarily, for example, by taking 10% off the top.

Interviewee #2: I believe that it can be and that the program manager uses it that way. The program manager will take management reserve off the top and then negotiate with the cost account manager.

Interviewee #3: The contractor develops management reserve budget by issuing less to the functional managers than they requested, thus, requiring them to accomplish their tasks with less funding. The contractor has a profit and loss motive for doing this.

Interviewee #4: No. Anything not spent on a cost reimbursement contract is saved by the government. If we are truly competing, contractors will bid the lowest price. It does not make sense to have the contractor submit a competing bid and then turn around and reduce their bid internally to allow for a management reserve budget. If the government really wants to manage MR better, I suggest they discuss risk of the program comprehensively in the contract proposal. Take for example a contract bid of \$100M. The contractor would bid an additional \$15M to cover the potential risk associated with the program. The management reserve would be part of the contract, however, there would be no fee associated with the management reserve budget as there is with the base contract. This method accepts a bid of management reserve and allows it to be used as intended without the government being charged an additional fee for the use of management reserve.

Interviewee #5: Yes. Upper management issues a "management challenge" to the functional managers. If the functional managers meet this challenge then they are rewarded with an incentive award, usually a monetary bonus. The following is an example: the functional manager estimates that they require ten people to accomplish a particular task. Upper management assumes there is a reserve built into the estimate and allows for nine people to accomplish the task. At the same time upper management will issue a "management challenge;" challenging the functional manager to complete the task with eight people instead of nine. The incentive to complete the task with eight instead of

nine is usually a monetary bonus. If the functional manager meets this challenge they are sometimes awarded the monetary bonus.

Interviewee #6: Yes. It is used to challenge the functional managers to complete budgets for a lessor amount.

Interviewee #7: I don't think so. I have heard companies talk about it, but I have never seen it done. I don't see how management reserve plays into an incentive scenario.

Interviewee #8: I would not think so. Usually there an incentive or award fee contract with the program itself.

Interviewee #9: Management reserve budget may be withheld by the contractor to reduce budgets given to task managers thereby incentivizing them to accomplish the work at lower cost than if their task budgets were larger. Such use of management reserve is entirely at the discretion of the contractor.

Interviewee #10: Not sure. I'm sure some do use it as an incentive. In my experience I have not seen it used in this manner.

Assessment: The interviewees disagreed on whether the management reserve is developed for use as an incentive. Six of the ten interviewees indicated that management reserve is used as an incentive tool. Three said that management reserve is not used as an incentive tool and one was not sure.

The difference in interviewee responses indicates that management reserve budget could be and is utilized differently depending on the contractor. The management reserve budget used as a tangible funding tool and the management reserve budget used as an abstract means to motivate employees are examples of how the management reserve budget might be utilized differently. The difference in how the management reserve budget might be used would largely depend on the contractor's management style. It is feasible that management reserve would be used as an incentive to motivate functional managers and cost account managers to meet budget constraints. Functional managers and cost account managers are often evaluated on performance. If their performance is measured by staying within their proposed budget, then they would be motivated or

incentivized to complete the task with the assigned budget. Likewise, it is just as feasible that management reserve budget be utilized solely as a funding "safe-net." This "safe-net" is there to assure both the government and the contractor that difficulties/uncertainties with the project have been budgeted.

#### 4. When is management reserve budget determined?

Interviewee #1: Usually it is determined too late. If it is determined after the contract has been negotiated then it is too late. Management reserve must be linked to the risk management plan and considered during the request for proposal. I am aware of one contract where management reserve was negotiated.

Interviewee #2: Upfront. As soon as the contract is awarded. The program manager will back out a percentage after the contract is awarded or sometimes will wait to back out a percentage until after the cost account manager submits their initial budget.

Interviewee #3: The management reserve budget is determined early on. Later, depending on the negotiated contract, management reserve budget may change or it may not. That is to say, if the contract is negotiated for less than originally anticipated, management reserve may have to be adjusted accordingly.

Interviewee #4: The management reserve budget is determined after the contract is negotiated, but prior to developing the performance measurement baseline.

Interviewee #5: Management reserve budget is determined only after the government and contractor have reached a negotiated agreement.

Interviewee #6: As soon as possible. Usually after the contract has been negotiated.

Interviewee #7: The management reserve budget is determined up front at the start of the contract. This is not to say that the management reserve budget cannot change. There are occasions when the management reserve budget is adjusted. Sometimes management reserve is decreased due to unknown unknowns and other times it is increased due to task requirements becoming unnecessary.

Interviewee #8: Usually after the contract is negotiated. Management reserve is extracted from the negotiated contract amount. The remaining funding is allocated between the work breakdown structure.



Interviewee #9: Management reserve budget normally is established in the initial contract planning immediately following contract award. The contractor takes the management reserve budget out of the total contract budget prior to allocating the budget to the organizational or cost account managers. (A contractor establishing management reserve budget before contract award risks having the DoD contracting officer identify it as a "contingency" and removing that amount from the contract.)

Interviewee #10: Management reserve is determined during the planning of the Performance Measurement Baseline.

Assessment: According to the interviewees, the best time to develop the management reserve budget is as early in the budgeting process as possible.

Unfortunately, these early estimates are just that--estimates. The interviewees gave several examples of why the original estimates may change. They include: 1) Final contract negotiations may have provided a smaller or larger contract base and 2) New tasks may become necessary while other tasks disappear altogether.

As a result of this uncertainty, the management reserve budget has the potential of being revised during any stage of the contract. Although it is desirable to determine the management reserve budget as early as possible in the program, there are no guarantees that the management reserve budget will remain constant.

The suggestion that the management reserve budget be determined when the greatest amount of information is present may also warrant consideration. During the early stages of a program many questions are often still unanswered. However, as additional information becomes available more accurate estimates can be provided. Unfortunately, the greatest and most accurate information about a program usually becomes available only after the project is completed. There needs to be a break-even point. A point early enough in the program to provide planners with a timely estimate of the management reserve budget, however, a point late enough in the program for the estimate to have important significance.

5. Who determines management reserve budget and where is it controlled?

Interviewee #1: The contractor program manager is the one who determines the management reserve budget. The program manager is also the individual who controls or delegates the authority to whoever is best qualified to control the management reserve.

Interviewee #2: The program manager determines the management reserve and the management reserve is generally controlled by the program manager. Sometimes management reserve is a separate entity. One contractor had sub-project team managers, similar to an integrated product team structure, who controlled their own management reserve. The total management reserve was still rolled up to be tracked and reported at the program manager level.

Interviewee #3: Management reserve is determined differently by different contractors. The individuals with the most political clout usually determine the management reserve budget. The program manager or program control chief typically controls the management reserve budget. Ideally, you would prefer the management reserve budget to be controlled jointly. Some companies have sought to make the determination of management reserve a painless procedure by taking a straight percentage off the top with the program manager or program management office having the authorization to allocate the management reserve budget when circumstances arise.

Interviewee #4: The program manager both determines and controls the management reserve budget.

Interviewee #5: What can be negotiated out of requests for budgets usually determines the management reserve budget. The management reserve budget is always controlled at the Program Manager level, never by the functions.

Interviewee #6: The program manager establishes the management reserve. The program manager controls the people who control the use of the management reserve. All uses of the management reserve should be approved by the program manager. Management reserve might be fenced (partitioned by organization) at the program manager level. This ensures management reserve is not consumed by one organization.

Interviewee #7: Normally, management reserve is determined by the program manager or the cost/schedule control organization once it has been approved. It is usually controlled by the cost/schedule control organization.

Interviewee #8: The integrated product team (IPT), which consists of senior contractor program executives, determines the management reserve budget. It is controlled by the program manager who is a member of the IPT. The program manager controls the management reserve budget by requiring any movement of the budget to be approved by the IPT. Occasionally, the IPT will allocate a small portion of management reserve to the

next lower level integrated product team manager. The lower level IPT manager can unilaterally control this portion of the management reserve and use it for unplanned in-scope tasks. However, any usage of management reserve is still reported to and controlled by the higher level IPT.

Interviewee #9: The contractor determines the management reserve budget. Usually the contractor's program manager controls the management reserve at the total contract level. However, the contractor is at liberty to designate some other executive to control management reserve. Organizational or cost account managers may be given allocations of management reserve, but this is not normal, and in any event the management reserve budget still must be controlled at the total contract level.

Interviewee #10: The program manager usually determines the management reserve. It is also controlled by the program manager.

Assessment: Every interviewee agreed that the management reserve budget is determined and controlled by either the Program Manager or the executive program management. However, exceptions were noted. A few of the interviewees had witnessed cost account managers provide inputs and feedback to the Program Manager, assisting in determining the management reserve budget.

In theory, one would expect that those individuals with the experience and knowledge to establish the management reserve budget would be the individuals actually accomplishing the budgeting task. But in reality, there is too little time or funding available to execute a formal budgeting process for the management reserve budget. As a result, the responsibility of determining the management reserve budget is left to the Program Manager. The Program Manager then must take the information that is available at the time and attempt to establish an accurate management reserve budget.

## 6. What factors influence the development of management reserve budget?

Interviewee #1: Risk management is the main factor that influences the development of management reserve budget. It is often a preconceived idea that management reserve budget should be some arbitrary percentage of the contract base budget. Instead

management reserve budget should be determined by the overall probability of meeting the budget.

Interviewee #2: The uncertainty of the program. How confident the contractor is that they can complete the contract for the stated bid.

Interviewee #3: The contractors management philosophy influences the development of management reserve budget. Another influence is incentivization, to encourage the employee to do the job as cost effectively as possible. Such personnel incentives, implies that accomplishing the job task with less budget will increase the likelihood of being promoted. Also, the percent of risk in effort (i.e. the probability of technical, schedule, and contractual risk) will influence the development of management reserve budget.

Interviewee #4: A mixture of factors influence the development of management reserve budget. Risk is the biggest influence. There is technical risk where management reserve is pulled to cover such things as design contingencies. There is also programmatic risk. The amount of funding Congress is going to authorize is always uncertain. DoD funding baselines are always changing making it difficult to forecast which programs will be funded. Change is risk, and costs money to manage.

Interviewee #5: Same as #5. The management reserve budget is influenced by what can be negotiated from the functions.

Interviewee #6: The risk of the program. It could be a performance risk or a cost risk where the labor rate increases. There could also be outside influences that drive up cost such as new technology.

Interviewee #7: Two-thirds of companies use a block set aside of 'X' percent of the CBB for management reserve and the other third use a risk management plan for determining management reserve. There are two approaches to risk management: 1) obtain input from the engineers; 2) obtain input from cost estimators. What you really want is a team effort to include engineers and cost estimators.

Interviewee #8: In the engineering, manufacturing and development environment you are going to have a moderate amount of technical risk. Management reserve must be allocated to cover this risk. How well the lower level IPT and CAM executes his or her budget to complete the work can also influence the development of the management reserve budget. A well executed work breakdown structure element may have 10% taken from its budget, whereas, a poorly executed work breakdown structure element might only have 2-3% taken from its budget. Contractor efficiency also influences the management reserve budget. Many times as the contract progresses, planned tasks that were originally required to ensure the success of the contract may no longer be necessary. As a result, work packages are closed and the respective budget is transferred back to the main management reserve.

Interviewee #9: The determination is entirely up to the contractor. In arriving at the proper amount of management reserve budget, evaluation of the major risks is surely a prime factor. The degree to which the contractor wants "motivizational" or incentivized budgets is another important factor. In assessing the risks, the near-term clearly-defined work probably will be less risky than the far-term ill-defined or undefined work. Also work which is the same as or very similar to work which has been done previously will have less uncertainty (and impel less management reserve) than work which is not familiar.

Interviewee #10: How it is developed. Skimming a percentage of the top inherently has inaccuracies with it. The top-down method in itself has short comings.

Assessment: Risk, time, and experience are the three main factors which influence the development of the management reserve budget. Time and experience are more straight forward. If an individual has more time and experience, that individual will know where and how to begin the research necessary to develop an accurate and complete management reserve budget estimate. They will also have additional time that may be required to conduct a more in-depth level of research.

Risk, however, is a much more complex issue. There are many forms of risk which can influence the development of the management reserve budget. There is contractual risk, funding risk, and performance risk just to name a few. Each of these risks have the potential to affect the management reserve budget. In order to minimize their impact these risks must be identified and assessed. The assessments of the risks are then used to assist in the computation of an appropriate level of management reserve budget.

7. The development of management reserve budget has been characterized as a top-down or bottom-up process. In the top-down method, the initial amount of management reserve budget is determined by multiplying the Contract Budget Base by a percentage. In the bottom-up method, the amount of management reserve budget is determined by adding management reserve budget estimates made by cost account managers.

a. Is this a correct characterization? Please explain.

Interviewee #1: Yes, just top-down. It cannot be bottom-up due to the gamesmanship that usually accompanies the bottom-up method. When conducting the bottom-up method some individuals will plus up their estimates to ensure a safety cushion in their estimate. The process should be a combination of the two methods. The estimate should be built from the bottom by the cost estimator with technical support from engineers. It should be a teamwork process where management is provided full visibility.

Interviewee #2: I have only seen top-down. I don't believe bottom-up is very popular. The cost account managers submit an invisible management reserve that is later negotiated at the program manager level.

Interviewee #3: I have seen the development of management reserve budget occur both ways. When the initial cost proposal is completed, then a contingency plan is prepared. The cost proposal identifies the knowns and the contingency plan identifies the unknowns. The process normally starts as a bottom-up with program management involvement taking place after the initial cost proposal is completed.

Interviewee #4: This is a nice characterization.

Interviewee #5: The top-down approach is usually employed when the program manager does not have the time or experience to challenge each and every budget. The bottom-up method, with the functional managers justifying and defending their estimates to the Program Manager, is the ideal way to develop the management reserve budget. However, this can be time intensive and not always a realistic alternative.

Interviewee #6: Yes.

Interviewee #7: Yes. Usually the top-down process occurs. Bottom-up could happen in theory, but not sure CAMs would be doing it. When the top man is involved, management reserve is usually a directed quantity based on gut feel with input from engineers' risk evaluations. Some proactive companies have created a three tier system. Each level of the organization maintains a separate management reserve account. Management reserve is negotiated amongst company managers during an off-site meeting. Still, other companies have adopted a process where each major group or department controls their own management reserve. Management reserve is determined by what is available and by what the company is comfortable with. Sometimes management reserve is determined by an across the board withhold. A contingency is anything a CAM sends a budget change proposal for.

Interviewee #8: Top-down is the correct characterization. The higher level IPT has control. The CAMs do not control the process. The CAMs are controlled by their functional managers and lower level IPT managers. CAMs assist the higher level IPT in

estimating the risk involved for their particular work breakdown structure elements which is used to estimate the total management reserve.

Interviewee #9: Yes. Top-down using a percentage, I believe, the usual approach. However, this is not mandatory. Other top-down approaches include estimating the (1) risk by organization, (2) risk by work breakdown structure element, or (3) amount (rather than percentage) for the total contract.

Interviewee #10: Yes.

Assessment: The interviewees agreed that this was a correct characterization of the development of the management reserve budget. Although most of the interviewees concluded that the top-down approach was most prevalent method for developing the management reserve budget, they did not necessarily think it was the most accurate. A few of the interviewees felt a combination of the two methods, top-down and bottom-up, would provide a better methodology for developing the most accurate management reserve budget. The interviewees also recognized the additional time and resources that would be required to implement both strategies. They also recognized that this combined approach would not necessarily be cost effective or feasible.

b. If this is a correct characterization, then which way is most common in your organization? Which is most common in the defense industry?

Interviewee #1: Top-down is the most common.

Interviewee #2: Top-down from what I have seen.

Interviewee #3: The most common is the top-down process where a fixed percentage is taken. The bottom-up process is only done in the proposal stage. I have never seen it done in the post-proposal stage.

Interviewee #4: Top-down in our industry. The contractor bids the jobs for what it will cost excluding the contingencies. However, the contractor identifies potential risks through mitigation plans. The mitigation plans help to minimize the risk.

Interviewee #5: While I was still with the Northrop Corp. they used the bottom-up approach where budget scrubs were used to justify the amount of the management reserve budget. I am not sure what is the most common in the defense industry.

Interviewee #6: A modified top-down is the most common in the defense industry. Allowances based on input from the functional managers might be made if there is a high risk area.

Interviewee #7: Top-down for contractors.

Interviewee #8: In the contractor's organization, top-down. In the defense industry, I'm not sure. My understanding is the contractor program manager level must have control of the management reserve budget. Any budget that is transferred must be approved by the program manager.

Interviewee #9: Top-down is, I believe, the most common.

Interviewee #10: That is a question for the defense industry.

Assessment: The overwhelming answer to this question was top-down. The top-down approach appears to be a much more feasible solution than the bottom-up approach. The top-down approach is a quick and easy solution to a complex and questionable problem.

c. How is the percentage determined in the top-down method?

Interviewee #1: Probably with a certain amount of arbitrariness.

Interviewee #2: The percentage is determined by what the program manager thinks they can do it for. If the program manager thinks they can complete the program with 90% of the total contract budget, then there is a 10% management reserve. This provides a general range. The cost account manager budget input will help narrow the range.

Interviewee #3: The percentage determined in the top-down method is determined by the management philosophy of the contractor, program manager, or program control chief. It is usually some 'X' percentage of the negotiated contract. Some contractors try and use a smart code, where high risk tasks are left alone and low risk tasks are tapped to fill the majority of the management reserve budget requirement.

Interviewee #4: The percentage determined in the top-down method is based on risk.



Interviewee #5: The percentage is determined arbitrarily, but based on the best judgment of the project manager. Given the uncertainty and risk of a program, it is difficult to accurately estimate the required percentage. The percentage will vary by program.

Interviewee #6: There are no set standards or policies in this area. An arbitrary percentage is determined based on many factors associated to the risk of the program.

Interviewee #7: The percentage can be determined in several ways, but almost invariably the financial management organization will receive enough information necessary to determine a realistic percentage for computing management reserve budget.

Interviewee #8: The percentage is completely tied to the risk associated with the program and experience of the IPT. It is determined by the IPT. The IPT approximates the budget amount that is required to cover the risk. This amount is then taken as a percentage of the contract budget base.

Interviewee #9: It is up to the contractor. Experience will help. If experience is too limited, seek help from consultants or other contractors.

Interviewee #10: Often times it is a wag of around 10%; I don't know the exact percentage. The program manager takes a cut off the top. The percentage is determined based on experience and or with input from the cost account managers. Ideally the way to do it would be a bottom-up method allowing the cost account managers to determine their own uncertainty. Inherently this is what a risk plan is.

Assessment: The percentage used to compute the management reserve in the top-down method is determined by the Program Manager. The percentage is usually a subjective estimate based on a subjective risk analysis. The analysis is based on project risk, funding risk, and contractual risk. The analysis is typically subjective due to time constraints, lack of experience, or both. In an ideal scenario, a Program Manager would secure enough time and funding to conduct an objective risk analysis assessment necessary to establish an appropriate management reserve budget. This would include in-depth analyses of past programs and current cost account manager estimates.

The interviewees were not aware of the existence any methodologies, for calculating a specific percentage based on a specific risk, critical for calculating an accurate management reserve budget.

d. How do cost account managers estimate management reserve budget in the bottom-up method?

Interviewee #1: I'm not sure. The cost account managers are usually told or given the amount of management reserve they will receive. The cost account managers submit an overall budget estimate. Upper management will more than likely make changes to their submission. There is not necessarily a link between what they submit and what they actually get.

Interviewee #2: They add a cushion into their budget in the top-down method not the bottom-up method.

Interviewee #3: CAMs estimate contingencies in the bottom-up method through the initial cost proposal. Cost folks try to assign probabilities and dollars to unknowns. These estimates are rolled up and briefed/scrubbed by the chain of command then the cost proposal is finalized.

Interviewee #4: We don't let the CAM estimate the management reserve budget. We let the CAM identify potential risk and the best ways to reduce or minimize that risk.

Interviewee #5: The cost account managers never truly identify a management reserve budget. They call it something else by cushioning their individual cost account budget, but all management reserves should be owned by the project manager, period.

Interviewee #6: Past experience will dictate how CAMs estimate management reserve. Normally, cost account managers do not estimate management reserve, unless they are hiding funding in which case is an underrun not a management reserve. An underrun implies it is tied to the budget.

Interviewee #7: As much as they can get away with. How do they know how much budget they are supposed to have? Normally, their actual budget comes back for less than their estimate.

Interviewee #8: I am not familiar with this method. However, I imagine they would support the IPT by providing budget estimates to their functional and lower level IPT managers who in turn would supply the budget estimates back to the IPT.

Interviewee #9: Based on the estimate they made and submitted for the contractor's proposal. If the proposal has been reduced in contract negotiations, this would have an effect on the management reserve budget estimate by the CAM, i.e., a lower contract budget would likely mean a lower cost account budget and a desire by the CAM for a larger management reserve, but less likelihood that the CAM could obtain a larger management reserve. Assuming CAMs have control over their portion of the management reserve, CAMs usually want all the management reserve they can get, because this gives them more flexibility and they can better keep performance within budget.

Interviewee #10: A mixture of hard documentation or procedures and gut feel based on experience and historical data maintained by individual cost account managers.

Assessment: The cost account managers appear to have little input in the development of the management reserve budget. Although they are the ones monitoring the lowest level of the contract work breakdown structure, little credibility is afforded to them. As a result, if they want to include a management reserve in their budget they must do it without the request or knowledge of their superiors. Their budgets are given to them with little or no input, however, they are still responsible for completing tasks with their assigned budgets.

## **Chapter Summary**

Overall Assessment: The individuals interviewed for this project provided distinct and relevant answers. There were some differences in opinion as to the purpose of management reserve. For the most part there was a clear and deep understanding of management reserve's purpose. There was a clear understanding that there was not an easy, accurate method for developing a management reserve budget. Time, funding and experience constraints typically prevent the establishment of a management reserve budget using detailed methodologies with any significance. Although attempts are being made to demonstrate a methodology that produces an accurate management reserve budget based on a predetermined amount of risk, at this point in time nothing has been documented and substantiated.

This concludes the analysis section of the thesis project. The next chapter presents the conclusions of the thesis project and recommendations for further study in this area.

## **V. Conclusions and Recommendations**

### **Contractor System Descriptions**

Reviewing the contractor system descriptions revealed no prescribed format for the presentation of C/SCSC as it pertains to the management reserve budget or any other criteria. Each of the five system descriptions reviewed were presented in a unique style and format. Although different companies emphasized distinct aspects of their planning process, there did not appear to be any minimum standard that was required of the contractor system description.

On average, the five contractor system descriptions dedicated less than a page to discussing and explaining of the management reserve budget. While the definition of management reserve is fairly simple and straight forward, the purpose and development of management reserve can be ambiguous and confusing. Much more detail should be afforded if the sections on management reserve are to reveal how management reserve is developed.

The most lacking aspect in the presentation of management reserve budget in the contractor system descriptions is how to accurately develop the management reserve budget. The brief synopsis reviewed in the contractor system descriptions covering the development of the management reserve budget did not provide a detailed methodology necessary to develop and establish an accurate management reserve budget.

### **Individual Interviews**

The individual interviews provided insight on how the purpose and development of the management reserve budget was perceived by individuals with diverse acquisition positions and backgrounds in the acquisition process. The individuals interviewed had similar views on the purpose and the development of the management reserve budget.

Occasionally, differences did appear. This usually occurred when individuals had dissimilar backgrounds (contractor vs. government) or different ranks in the acquisition hierarchy (DoD vs. base-level).

The differences included both personnel and technical issues surrounding the development of the management reserve budget. From a personnel stand point, it is difficult to persuade individuals with different agendas and priorities to consistently agree on issues that will adversely affect their respective interests. The budgeting process is a political one and must be treated as one. It does not matter if you are referring to the overall budget or the management reserve budget everyone wants as much as he or she can get. As a result, individuals and organization tend to become self-serving. Individuals as well as organizations need to be able to look at the bigger picture and take an objective, not subjective, approach to the issue of developing a management reserve budget.

Once the personnel issues are addressed, the issue of how to provide an objective management reserve budget needs to be addressed. Currently, there is not a consistent objective methodology for estimating the management reserve budget. The derivation of a formal methodology to develop a management reserve budget must occur if the significance and accuracy of the management reserve budget is to improve. This formal methodology would provide a common methodology for all to use and would surely enhance the credibility of the management reserve budget and what it represents.

Similarities were reflected by the attempts of certain government organizations to develop a common methodology to objectively estimate a management reserve budget. There is an attempt to systematically relate the amount of risk associated with a particular program to the amount of management reserve required to that risk. This could be a feasible solution to developing an objective and accurate management

reserve budget. However, it would require involving the cost account managers in the management reserve budgeting process.

The involvement of the cost account managers would certainly increase the accuracy of the management reserve budget, but it would not necessarily guarantee the unbiased estimates critical to the budgeting process. The interviewees suggested there may be suspicion by both upper and lower management that the other is not being completely forthright. By involving the cost account managers in the budgeting process, perhaps the two sides will begin to work as a team to improve the process, instead of against each other. The negative side to bringing the cost account managers into the management reserve budget process is the requirement of additional time and resources. As with any major decision, both the costs and the benefits must be weighed to determine if providing an objective, accurate management reserve budget is worth the additional time and effort.

## **Recommendations**

After reviewing several contractor system descriptions and administering numerous interviews with experienced C/SCSC facilitators the following recommendations are proposed.

First, contractor system descriptions should be required to provide concrete scenarios in which management reserve could and would be used. This would undoubtedly show a clear understanding as to the purpose of management reserve which would leave no room for error when the management reserve is employed

Second, contractor system descriptions should be required to provide complete detailed plans for the development of the management reserve. The contractors need to go beyond stating that a risk assessment will be accomplished. The contractor system

description needs to deliberately, step by step, document the methodology adopted to establish a particular management reserve.

Finally, additional research needs to be conducted in this area of study. Specifically, the relationship between how a particular management reserve was established and the resulting manner in which it is exhausted needs to be examined.



## **Appendix A: Definitions**

**Contract Budget Base.** The negotiated contract cost plus the estimated cost of authorized unpriced work (3:11-B-2-2).

**Cost/Schedule Control Systems Criteria (C/SCSC).** A set of 35 criteria used to provide contractor and government program managers with accurate data to monitor execution of their program and to: 1) preclude the imposition of specific costs and schedule management control systems by providing uniform evaluation criteria to ensure contractor cost and schedule management control systems are adequate; 2) provide an adequate basis for responsible decision-making by both contractor management and DoD component personnel; and 3) bring to the attention of DoD contractors, and encourage them to accept and install, management control systems and procedures that are most effective in meeting requirements and controlling contract performance (3:11-B-1).

**Management Reserve (MR).** An amount of the total allocated budget withheld for management control purposes, rather than designated for the accomplishment of a specific task or set of tasks. It is not part of the performance measurement baseline (3:11-B-2-2).

**Performance Measurement Baseline (PMB).** The time-phased budget plan against which contract performance is measured. It is formed by the budgets assigned to scheduled cost accounts and the applicable indirect budgets. For future effort, not planned to the cost account level, the performance measurement baseline also includes budgets assigned to higher level contract work breakdown structure elements and undistributed budgets. It equals the total allocated budget less management reserve (3:11-B-2-3).

**Total Allocated Budget (TAB).** The sum of all budgets allocated to the contract. Total allocated budget consists of the performance measurement baseline and all management reserve. The total allocated budget will reconcile directly to the contract budget base. Any difference will be documented as to quantity and cause (3:11-B-2-3).

**Undistributed Budget.** Budget applicable to contract effort which has not yet been identified to contract work breakdown structure elements at, or below, the lowest level of reporting to the Government (3:6-B-1).

**Work Breakdown Structure (WBS).** A product-oriented family tree division of hardware, software, services, and other work tasks which organizes, defines, and graphically displays the product to be produced as well as the work to be accomplished to achieve the specified product (3:6-B-1).

## **Appendix B: Interview Questions**

1. What is management reserve budget?
2. Is management reserve budget developed for in-scope contingencies? Please explain.
3. Is management reserve budget developed for use as an incentive? Please explain.
4. When is management reserve budget determined?
5. Who determines management reserve budget and where is it controlled?
6. What factors influence the development of management reserve budget?
7. The development of management reserve budget has been characterized as a top-down or bottom-up process. In the top-down method, the initial amount of management reserve budget is determined by multiplying the Contract Budget Base by a percentage. In the bottom-up method, the amount of management reserve budget is determined by adding management reserve budget estimates made by cost account managers.
  - a. Is this a correct characterization? Please explain.
  - b. If this is a correct characterization, then which way is most common in your organization? Which is most common in the defense industry?
  - c. How is the percentage determined in the top-down method?
  - d. How do cost account managers estimate management reserve budget in the bottom-up method?

## **Bibliography**

1. Budget of the United States Government Fiscal Year 1993. Washington DC: U.S. Government Printing Office.
2. Chalos, Peter and Susan Haka. "Participative Budgeting and Managerial Performance," Decision Sciences, Vol. 20: 334-347.
3. Department of Defense. Cost/Schedule Control Systems Criteria Joint Implementation Guide. AFSC/AFCC/AFLC P173-5, AMC-P 715-5, NAVSO P3627, DLAH 8400.2, DCAA P7641.47. Washington DC: U.S. Government Printing Office, 1 October 1987.
4. Department of Defense. Defense Acquisition Management Policies and Procedures. DoD Instruction 5000.2. Washington DC: Government Printing Office, 23 February 1991.
5. Fleming, Quentin W. Cost/Schedule Control Systems Criteria. Chicago IL: Probus Publishing Company, 1992.
6. Kren, Leslie. "Control System Effects On Budget Slack," Advances in Management Accounting, Vol. 2: 109-118 (1993).
7. Merchant, K.A. "The Control Function of Management," Sloan Management Review, Vol. 20: 43-55 (1982).
8. Merchant, K.A. "Budgeting and the Propensity to Create Budgetary Slack," Accounting, Organizations and Society, Vol. 10, No. 2: 201-210 (1985).
9. Merchant, K.A. Rewarding Results. Boston MA: Harvard Business School Press, 1989.
10. Slemaker, Chuck M. The Principles and Practice of Cost Schedule Control Systems. Princeton NJ: Petrocelli Books, 1985.

### Vita

Captain Kevin T. Gould was born on 30 October 1966 in Fullerton California. He graduated from Flagstaff High School in 1985 and earned a Bachelor of Science degree in Applied Mathematics in 1989 from the United States Air Force Academy. He was first assigned to the Air Force Operational Test and Evaluation Center located at Kirtland AFB New Mexico, as a space and electronics reliability and maintainability analyst. In March of 1991, he was transferred to Eielson AFB Alaska where he assumed the duties of Deputy, Financial Analysis Branch, 343 Fighter Wing. In May of 1994 Captain Gould entered the Graduate Cost Analysis Program, School of Logistics and Acquisition Management, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio. In September of 1995 he graduated with a Masters of Science degree in Cost Analysis. His follow-on assignment was to the Financial Management Directorate at Headquarters Air Force Materiel Command. He is married to the former Karen Hedglon from Onieda, New York. They have a son named Troy.

Permanent Address: 10605 N. 11th Pl  
Phoenix, AZ 85020

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE September 1995	3. REPORT TYPE AND DATES COVERED Master's Thesis		
4. TITLE AND SUBTITLE  AN ANALYSIS OF THE PURPOSE AND DEVELOPMENT OF MANAGEMENT RESERVE			5. FUNDING NUMBERS	
6. AUTHOR(S)  Kevin T. Gould, Captain, USAF				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Air Force Institute of Technology, WPAFB OH 45433-6583			8. PERFORMING ORGANIZATION REPORT NUMBER  AFIT/GCA/LAS/95S-3	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)  OUSD (A) APR/PM Washington DC 20330			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT  Approved for public release; distribution unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  This study investigates both the purpose and development of management reserve budget as it pertains to the Cost/Schedule Control Systems Criteria outlined in DoD Instruction 5000.2. With the Defense Department facing an environment of shrinking budgets, it is becoming increasingly critical for them to manage their acquisition programs as efficient and effective as possible. The objectives of this study were to gain insight, from both a government and commercial perspective, on both the purpose and the development of the contractor's management reserve budget. Contractor system descriptions and interviews of individuals associated with the government acquisition process were used to document and analyze the objectives of the study. The contractor system descriptions and personal interviews both provided detailed information on the purpose of the contractor's management reserve budget. However, neither data source provided a consistent, objective methodology for developing an accurate and comprehensive contractor's management reserve budget.				
14. SUBJECT TERMS  Management Reserve Budget, Cost/Schedule Control Systems Criteria, Contractor System Description, Management Control Systems, Participative Budgeting			15. NUMBER OF PAGES 59	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT DL	