

AD-A047 634

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHO--ETC F/G 15/5
AN ANALYTICAL VIEW OF ADVANCE INCENTIVIZED OVERHEAD AGREEMENTS --ETC(U)
SEP 77 P J LYNCH, J M PACE
AFIT-LSSR-14-77B

UNCLASSIFIED

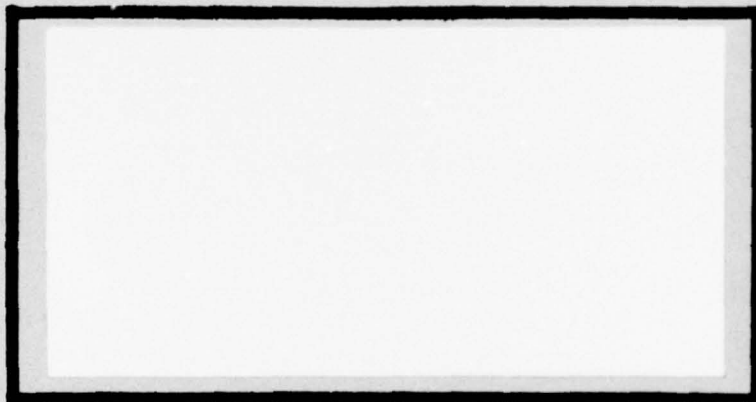
NL

1 of 2
AD
A047634

A microfiche card containing 140 frames of document pages. The frames are arranged in a grid of 10 rows and 14 columns. The first frame in the top row contains the title and authors information. The remaining frames contain various pages of text, including diagrams and tables. The text is too small to be legible in this view.

AD A 0 4 7 6 3 4

3
TK



UNITED STATES AIR FORCE
 AIR UNIVERSITY
 AIR FORCE INSTITUTE OF TECHNOLOGY
 Wright-Patterson Air Force Base, Ohio

AD No. _____
 DDC FILE COPY.

DISTRIBUTION STATEMENT A
 Approved for public release;
 Distribution Unlimited

DDC
 RECEIVED
 DEC 14 1977
 B

AN ANALYTICAL VIEW OF ADVANCE
INCENTIVIZED OVERHEAD AGREEMENTS
IN THE DEFENSE INDUSTRY

Patrick J. Lynch, 1st Lt, USAF
John M. Pace, Captain, USAF

LSSR 14-77B

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DDC
RECEIVED
DEC 14 1977
B

The contents of the document are technically accurate, and no sensitive items, detrimental ideas, or deliterious information are contained therein. Furthermore, the views expressed in the document are those of the author and do not necessarily reflect the views of the School of Systems and Logistics, the Air University, the United States Air Force, or the Department of Defense.

SECTION	
WDS	<input checked="" type="checkbox"/>
DOC	<input type="checkbox"/>
PARADIGMS	<input type="checkbox"/>
INS/INSTR	
DISTRIBUTION/AVAILABILITY CODES	
Dist.	REGULAR and/or SPECIAL
A	

AFIT RESEARCH ASSESSMENT

The purpose of this questionnaire is to determine the potential for current and future applications of AFIT thesis research. Please return completed questionnaires to: AFIT/SLGR (Thesis Feedback), Wright-Patterson AFB, Ohio 45433.

1. Did this research contribute to a current Air Force project?

- a. Yes b. No

2. Do you believe this research topic is significant enough that it would have been researched (or contracted) by your organization or another agency if AFIT had not researched it?

- a. Yes b. No

3. The benefits of AFIT research can often be expressed by the equivalent value that your agency received by virtue of AFIT performing the research. Can you estimate what this research would have cost if it had been accomplished under contract or if it had been done in-house in terms of man-power and/or dollars?

a. Man-years _____ \$ _____ (Contract).

b. Man-years _____ \$ _____ (In-house).

4. Often it is not possible to attach equivalent dollar values to research, although the results of the research may, in fact, be important. Whether or not you were able to establish an equivalent value for this research (3 above), what is your estimate of its significance?

- a. Highly Significant b. Significant c. Slightly Significant d. Of No Significance

5. Comments:

Name and Grade

Position

Organization

Location

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

AFIT/LSGR (Lt Col Barndt)
Wright-Patterson AFB OH 45433

AU FORM 6
JUL 74 6

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AFIT-LSSR-14-77B	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) AN ANALYTICAL VIEW OF ADVANCE INCENTIVIZED OVERHEAD AGREEMENTS IN THE DEFENSE INDUSTRY.		5. TYPE OF REPORT & PERIOD COVERED 9 Master's Thesis
7. AUTHOR(s) 10 Patrick J./Lynch, 1st Lieutenant, USAF John M./Pace, Captain, USAF		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Graduate Education Division School of Systems and Logistics Air Force Institute of Technology, WPAFB OH		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Department of Research and Administrative Management AFIT/LSGR, WPAFB OH 45433		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE 11 Sep 1977
		13. NUMBER OF PAGES 164 12 179p
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES APPROVED FOR PUBLIC RELEASE AFR 190-17. JERRAL F. GUESS, CAPT, USAF Director of Information		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Overhead Cost, Indirect Cost, Advance Agreement, Cost Control, Cost Analysis		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Thesis Chairman: Larry L. Smith, Lt Col, USAF		

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

Overhead costs constitute a substantial portion of the DOD dollars spent in the procurement of defense systems. Therefore, overhead control has become an area of special concern to government contract managers. Previous attempts to negotiate an advance agreement on total overhead costs have been unsuccessful due to a number of factors. This study examined those factors and another step in the evolution of advance agreement theory. This step involves the application of a sharing arrangement to underruns or overruns of the advance agreement target expenditure levels. In this study the authors outline the strengths and weaknesses of the current government overhead monitoring process, provide a basic structure for an advance incentivized overhead agreement and present the advantages and shortcomings of using such an agreement. The authors conclude that utilization of an advance incentivized overhead agreement will improve the current overhead monitoring process by establishing goal congruency between contractor profit and government cost goals and by facilitating the communication of government cost objectives to defense contractors. The advance incentivized overhead agreement formalizes the cost avoidance procedures of the government overhead monitoring team, procedures which are a distinct portion of the Air Force's Master Overhead Plan.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

LSSR 14-77B

AN ANALYTICAL VIEW OF ADVANCE INCENTIVIZED
OVERHEAD AGREEMENTS IN THE
DEFENSE INDUSTRY

A Thesis

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Logistics Management

By

Patrick J. Lynch, BS
1st Lieutenant, USAF

John M. Pace, BS
Captain, USAF

September 1977

Approved for public release;
distribution unlimited

This thesis, written by

1st Lieutenant Patrick J. Lynch

and

Captain John M. Pace

has been accepted by the undersigned on behalf of the faculty
of the School of Systems and Logistics in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT (PROCUREMENT MAJOR)

DATE: 7 September 1977

Larry L. Smith

COMMITTEE CHAIRMAN

Martin B. Martin

READER

ACKNOWLEDGEMENTS

Special thanks are extended to our thesis advisor, Lieutenant Colonel Larry L. Smith and our reader, Lieutenant Colonel Martin D. Martin for the constructive criticism and aid offered during the course of this research effort and writing of this thesis. We also wish to express our gratitude to Captain William S. Curry for his cooperation in providing us with much of the research information.

A great deal of sincere appreciation is extended to Anne Pace who not only provided encouragement and inspiration as only a wife could but who also volunteered cheerfully so much of her time for the typing of this thesis.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTSiii
LIST OF FIGURES.	ix
Chapter	
1. OVERVIEW AND RESEARCH METHOD	1
Overview	1
Statement of the Problem	1
Background	2
Cost analysis and overhead cost.	2
Structural changes in the Air Force.	8
Techniques for controlling overhead.	12
Direction of this research	20
Research Objectives.	23
Scope.	23
Assumptions and Limitations.	25
Research Questions	27
Research Method.	27
Organization of the Study.	32
2. CURRENT ACTIVITIES IN THE CONTROL OF OVERHEAD COSTS.	34
Indirect Costs Within a Firm	34
Indirect Costs Defined	34
Indirect Cost Allocation	37

Chapter	Page
Cost centers	37
The allocation process	38
Estimating indirect costs.	38
Transfer to major overhead pools	39
Activity bases	40
The Overhead Monitoring System	44
The Monitoring Team.	45
Review Cycle	47
Evaluating the Reasonableness of Volume Projections	49
Evaluating the Reasonableness of Budgeted Costs	51
Comparative Analysis	52
Engineering Analysis	53
MODE	57
Strengths and Weaknesses of the Overhead Monitoring System.	58
Strengths.	59
Weaknesses	64
Summary.	68
3. STRUCTURE OF THE ADVANCE INCENTIVIZED OVERHEAD AGREEMENT	69
Curry's Methodology.	69
Main Characteristics	70
An Illustration.	71
Primary Innovations.	75
Identified Alterations and Alternatives.	77

Chapter	Page
Contractual Arrangement	78
Mandatory vs. Voluntary	80
Basis for the Incentive	82
Separation of the Advance Agreement from the FPRA.	85
Government Involvement in the Contractor Budget Cycle.	86
Share Line Construction	87
Method of Funding	89
Treatment of Underruns and Overruns in Follow-on Targets	90
Construction of the Model Advance Incentivized Overhead Agreement.	92
The Proposal.	92
The Negotiation	94
Cancellation of the FPRA.	97
Settlement of the Incentive	97
The audit	97
Adjustment for exclusions	98
Target calculations	99
Actuals calculations.	102
Determination of the incentive award.	102
Summary	105
4. STRENGTHS AND WEAKNESSES OF THE ADVANCE INCENTIVIZED OVERHEAD AGREEMENT	106
Introduction.	106
Strengths of the Advance Incentivized Overhead Agreement.	106

Chapter	Page
Combined Negotiations	107
Plant-wide Emphasis on Overhead	107
Determining Reasonableness Before-the-Fact.	108
Timeliness of Final Settlement.	109
Derivation of an Independent Government Position.	110
Realistic Targets Likely.	110
Weaknesses of the Approach.	111
Gaming Possibilities.	111
Effect on Multiple Incentive Contracts.	112
Possibility of Windfall Profits	113
Reverse Cost Motivation	114
Short Range Contractor Benefits	115
Reduced Contractor Flexibility.	116
Administrative Difficulties	116
Relationship to Control System Characteristics	119
Summary	121
5. CONCLUSIONS	123
Findings.	123
Corollary Findings.	131
Recommendations for Further Study	134
Summary	135
Appendices	
A. ACRONYM LIST.	137

	Page
B. OBJECT MODES AND THEIR DRIVERS	139
C. ADVANCE OVERHEAD AGREEMENT	141
SELECTED BIBLIOGRAPHY.	152
AUTHORS' BIOGRAPHICAL SKETCHES.	163

LIST OF FIGURES

Figure		Page
1	Significance of Indirect Cost	5
2	Indirect Cost Behavior Patterns	36
3	Flow Chart of Monitoring Functions for Year Y . .	48
4	Industrial Engineering Analysis	56
5	Summary of Strengths and Weaknesses of the Government Overhead Monitoring System	60
6	Manufacturing Pool Target Calculations for ABC Electronics	100
7	G&A Pool Target Calculations for ABC Electronics	101
8	Calculation of Manufacturing and G&A Actuals Subject to the Incentive Feature for ABC Electronics	103
9	Summary of Strengths and Weaknesses of Using an Advance Incentivized Overhead Agreement. . .	118

Chapter 1

OVERVIEW AND RESEARCH METHOD

Overview

Statement of the Problem

Over the past decade there has been a dramatic change in the task assigned to the Department of Defense (DOD) with regard to the purchase of defense systems.

In the sixties, the charter to the DOD from the public, the Congress, and the President was to field the best possible fighting force regardless of the cost. In the seventies, the charter changed to one of fielding the best possible fighting force within certain budgetary constraints [62:ii].

This change, when combined with the magnitude of cost escalations in recent military procurements, has presented a real challenge to DOD procuring agencies (7:22). The challenge is not necessarily to reduce the cost of defense systems but rather to exercise greater control over procurement expenditures in order to mitigate the adverse effects of cost growth and cost overruns (57:Section 1-311).

Uncontrolled cost escalation in defense contracts has become a problem of prime concern for the DOD (7:22-25). In particular, the contribution of overhead costs to the total procurement cost of a defense system is of such a magnitude that its control has been identified by top DOD

officials as a special problem (30:17). It is the problem of controlling overhead costs to which this research effort is directed. In this study a technique is examined which may contribute substantially to the control of defense contractor overhead costs.

This initial chapter includes a brief discussion of the importance of overhead cost. Additionally, a number of major methods used to control overhead costs are presented. A subsequent statement of the research objective, the scope of the effort, the assumptions made in conducting the effort, and the research questions are provided. These sections are followed by the research approach and an overview of the remainder of the study.

Background

Cost analysis and overhead costs. In an effort to gain control over weapons acquisition expenditures, much emphasis is placed on cost analysis techniques by DOD procurement personnel (7:118). These techniques focus on individual cost elements in an attempt to reduce the uncertainty and quantify the risks associated with a procurement conducted in an other than competitive environment. The majority of DOD procurement dollars are awarded in a noncompetitive environment, and for such awards, the Armed Services Procurement Regulation requires some form of cost analysis (19:254; 57:Section

3-807.2). One cost element which is scrutinized in cost analysis operations is indirect or overhead costs¹ (57: Section 3-807.2). These costs are those which are incurred in the operation of a business but which cannot be specifically identified with the physical units being produced (29:88).

It has been generally acknowledged that indirect costs constitute a substantial portion of defense contracts, but it was not until empirical evidence was gathered that the true impact of these costs was brought to light. A dissertation by Otto Martinson entitled "Classification System for Indirect Costs of Defense Contractors in the Aircraft Industry" provided that evidence (38).

Martinson confirmed the importance and impact of indirect costs on defense contracts. In a review of the cost data of eleven airframe, avionics or engine contractor plants, Martinson found that indirect costs averaged 35.9 per cent of total cost input. However, once it was recognized that only 54 per cent of the total cost

¹ Indirect costs are defined as that portion of total costs remaining after direct labor, direct material (including subcontracts) and other direct costs are identified to a particular cost objective. For the purpose of this thesis, the terms indirect and overhead will be used interchangeably. Any reference to a given segment of these costs (i.e. manufacturing overhead, engineering overhead, general and administrative, etc.) will be clearly specified.

input was generated in-plant, prime contractor overhead as a per cent of prime contractor in-plant costs averaged a staggering 66 per cent (38:31)! Contractor plant averages ranged from 55 to 86.3 per cent. This cost relationship is shown in Figure 1. Although the magnitude of indirect costs may not be the same for every defense contractor in every industry and in each contracting environment, Martinson's study highlighted the potential impact of indirect cost control. Martinson went on to develop a model for analyzing and forecasting indirect costs. This model is addressed later.

Martinson's findings covering the years 1962 to 1966 are characteristic of the relationship of costs in the mid-seventies. DOD officials "have not seen a substantial shift in this relationship, if anything, indirect costs are larger [46]."

Little evidence of research which was conducted prior to that of Martinson was found pertaining to the control of indirect costs. The results of Martinson's research, however, has had far-reaching implications. As a result of Martinson's work top DOD officials became fully aware of the magnitude of indirect costs (30:18). In his September 1973 address to the National Security Industrial Association, Air Force Chief of Staff General George S. Brown stated:

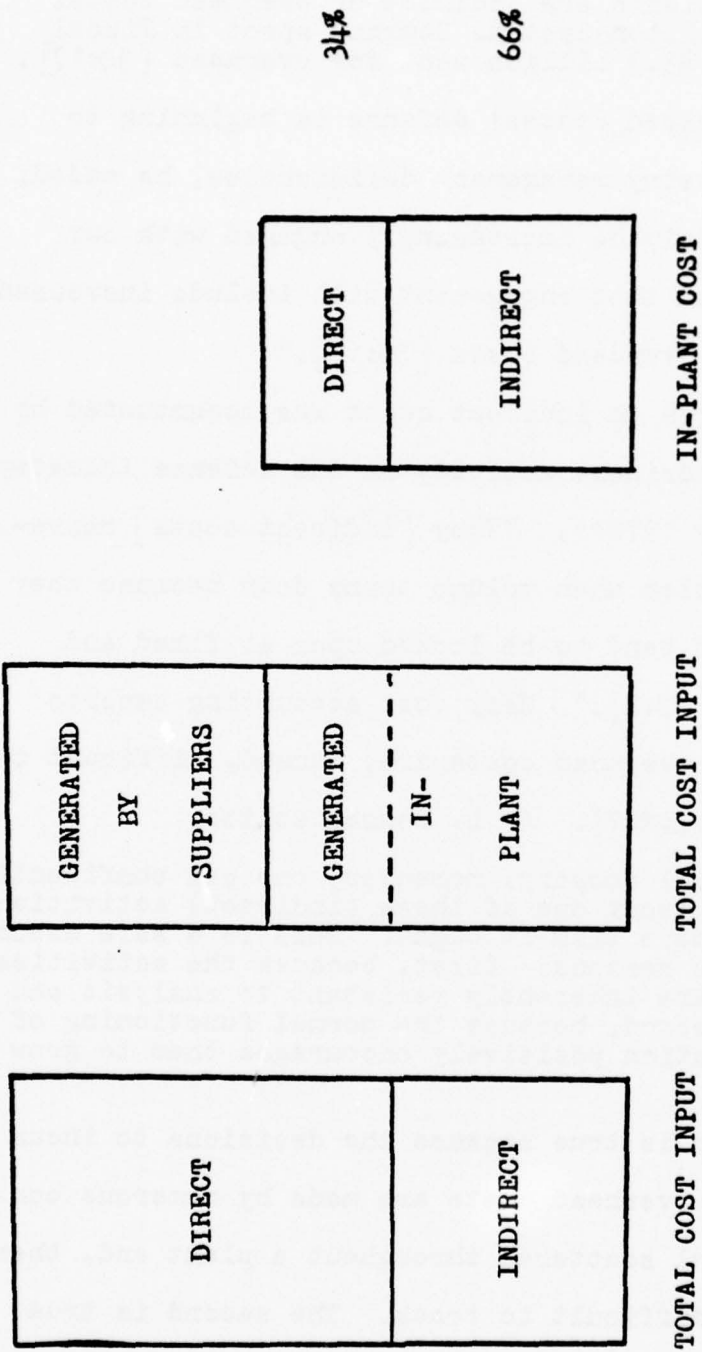


Figure 1 - Significance of Indirect Cost (39:33)

USAF studies find that anywhere from 50% to 60% of Air Force procurement dollars consumed in prime contractor plants are indirect or overhead costs. Of the \$7 billion Systems Command spent in Fiscal 1972, about \$3.3 billion went for overhead [30:17].

Charging that United States' defense is beginning to suffer from industry management deficiencies, he added, "We will definitely be increasingly engaged with our contractors. And that engagement will include increased visibility into overhead costs [30:17]."

This focus on indirect costs was accentuated by the decline in business activity in the defense industry during the early 1970's. "They [indirect costs] represent a real problem when volume turns down because they are in place and tend to be looked upon as fixed and very necessary [23:2]." Many cost accounting experts will agree that overhead costs are, indeed, difficult to control (40:117; 3:207). J. L. Newman states,

In the typical company, moreover, one can confidently assume that every one of these (indirect) activities is costing more than it ought. This is a safe assumption for two reasons: first, because the activities themselves are inherently resistant to analysis and control; second, because the normal functioning of the organization positively encourages them to grow [40:117].

The first reason is true because the decisions to incur or not to incur overhead costs are made by numerous contractor personnel scattered throughout a plant and, therefore, are very difficult to track. The second is true because organizations tend to foster growth and the

maintenance of internal capabilities (27:413-426). There is no reason to believe defense contractors are an exception.

In fact, there are a number of characteristics of the defense industry which tend to emphasize these reasons even more than in other industries. First of all, the government lays a number of requirements on contractors which the contractors may not normally accomplish on their own, thus increasing costs. Examples are the reporting requirements of the Selected Acquisition Information Management System and of ASPR Section 3-1200 pertaining to Cost Accounting Standards. Secondly, in periods of declining business activity, defense contractors are strongly motivated to retain their technical and supervisory staff in hopes of maintaining a competitive position capable of winning future defense awards. Thirdly, there is likely to be a strong relationship between indirect cost control and the degree to which the contractor senses himself to be in a sole-source position. A sole-source contractor has less of an incentive to control overhead than other contractors unless the possibility of a second sourcing strategy by the government is high or unless other program awards are endangered. The lack of contractor control, combined with the impact which indirect costs have on the expenditure of public monies, has caused increased government interaction in attempting to control this significant cost element (42:9).

Structural changes in the Air Force. In 1970 the Air Force Contract Management Division (AFCMD) of the Air Force Systems Command commenced placing overhead specialists in the contractor plants over which it had cognizance (17:6). The job of the overhead specialist is to advise the Principal Administrative Contracting Officer on all overhead matters. He also conducts evaluations of overhead costs and forward pricing rate agreement proposals² to assure that indirect expenditures are in line with government interests. The establishment of these positions was the first real Air Force commitment to the control of overhead costs and was "probably the most important change in policy for helping to avoid [indirect] costs... [62:15]."

In January 1973, Headquarters USAF issued policy constituting the Master Overhead Plan. This plan emphasizes three factors: 1) the concept of cost avoidance; 2) Air Force responsibility for overhead management at plants for which it has responsibility; and, 3) a larger role for the on-site plant office in the overhead process (52:1). Each of these factors is addressed below.

The cost avoidance element requires that the DOD

²The Armed Services Procurement Regulation, Section 3-807.12, defines forward pricing rate agreement (FPRA) as a written understanding negotiated between a contractor and the DOD to make certain rates available for use during a specific period of time in pricing contracts or modifications.

contract management function redirect its efforts "... to focus its attention on future action as opposed to the past events [61:28]." This concept is based on experience which shows that it is much easier to influence contractor decisions pertaining to the incurrence of unreasonable overhead costs than it is to reach a satisfactory settlement on the recovery of unreasonable expenditures after they are incurred (62:27). The problem with after-the-fact negotiating is that negotiations can only take place on expenditures which are questionable under the Armed Services Procurement Regulation (ASPR). If costs are deemed allowable and allocable under ASPR, the test of reasonableness can rarely be used in eliminating costs from an overhead claim because of their nebulous nature (62:9). This situation is caused by the nature of the negotiating process which implies compromise based on subjective evaluations. If incurred costs are disallowed in final overhead negotiations for failing the test of reasonableness, appeals to this decision are generally settled in favor of the contractor (62:6).

The reason for these settlements is that if the contractor incurred costs for a particular purpose, it is fairly obvious that he thought they were reasonable. Add this fact to a situation where the government fails to give prior notice of its intent to disallow those costs and

a strong legal case is built for the contractor. So, indeed, the concept of cost avoidance, that is, the attempt to restrain the incurrence of unreasonable costs, is clearly a step forward.

The second and third elements of the Master Plan lay the foundation for greater Air Force involvement in the overhead area (52:1). The second element is to assume primary overhead management responsibilities in accordance with ASPR Section 1-406 (52:1). Prior to the issuance of the Master Overhead Plan, many of the contractor plants under Air Force cognizance were audit determined with respect to overhead (62:25). This means that the Defense Contract Audit Agency (DCAA) maintained the responsibility to monitor and settle overhead matters. The third goal of the Plan is to involve the on-site Air Force office in the overhead surveillance and settlement activities. However,

Monitoring by the government does not relieve the contractor of his responsibility to manage or "control" overhead. The monitoring function is to influence the contractor's actions to assure that he meets that responsibility and to take the necessary steps when he does not [23:3].

This is the government response to contractor misgivings of the increased Air Force activity.

The establishment of Business Management Branches (originally called Overhead Branches) in Air Force Plant Representative Offices (AFPRO) followed the issuance of the Master Plan (12:1). The backgrounds of personnel

staffing the Branches typically include management, accounting, industrial engineering, auditing, and computer programming (12:1). The Business Management Branches utilize two primary methods in attempting to control costs. First, they maintain records on unallowable costs to insure that such costs are not borne by the government. Secondly, they use their technical expertise to analyze the contractor's procedures and recommend specific actions to minimize unnecessary indirect expenditures. While the Branches have been successful in discovering and avoiding unallowable costs, the Air Force has found that contractors are reluctant to accept specific recommendations to reduce indirect expenditures (12:1). The reasons for this reluctance may be multiple. Defense contractors have always been very protective of their managerial discretion. Total acceptance of government recommendations might result in the tacit invitation of government intervention. In addition, as mentioned earlier, the contractor's desire to keep his technical team and capabilities intact, etc., may be stronger than his desire to control costs over the short run.

The very nature of overhead costs compounds the difficulty of the task facing Business Management Branches.

It is particularly difficult - perhaps impossible - for government personnel to monitor overhead and administration, since efficiency in these areas depends on thousands of small decisions made by contractor personnel [19:240].

In the past two years the AFPRO responsibility for the control of overhead has grown even larger as authority for final overhead settlement has been delegated to the plant level (13). Prior to the delegation of this authority, the party which conducted final overhead negotiations was entirely separate from the one performing day-to-day administration. This situation caused a "serious division of responsibility and authority in the performance of critical reviews or negotiations [17:7]."

If a contractor is challenged by an on-site ACO [administrative contracting officer] over some overhead expenditure and the contractor knows that he will not have to negotiate final overhead costs with this ACO, the contractor will not feel inclined to defer the incurrence of such costs [62:16].

With the authority for final overhead settlement delegated to the AFPRO, problems such as described above are mitigated (17:7).

As previously indicated, a great deal of progress has been made in the structuring of overhead management responsibilities. General Brown has aptly summarized these adjustments in the following way.

The thrust, in other words, is to take action before these costs are incurred, rather than arguing endlessly after money has already been spent, and those who decide what is not allowable according to the forward pricing rate agreement will be around to insure the final settlements are consistent with the agreement [30:18].

Techniques for controlling overhead. The structural and procedural adjustments which the Air Force has made have been

complemented by a number of specific methodologies developed to aid in the control of overhead costs. A few of the more significant ones are discussed below. These methodologies are Probability of Incurring Estimated COST (PIECOST), Refined PIECOST or Monitoring Overhead through Discrete Evaluations (MODE), advance agreements and the use of award fees.

PIECOST was the name given to the statistical model developed by Martinson in his dissertation and was included among the improved pricing and costing techniques known as COPPER IMPACT (36). The PIECOST approach used simple linear regression techniques to develop linear relationships between an independent parameter and an overhead cost element. All contractor overhead costs were stratified into twelve homogeneous cost groupings. The variation of costs in these groupings was related to the variation of an independent parameter which could logically act as a "driver" for that cost grouping. For example, indirect headcount could be used as a driving force behind the level of costs incurred in the category labeled indirect labor. A listing of the twelve cost groupings called object modes and typical drivers for the modes is shown in Appendix B (34:13). The PIECOST model was built on a computer time-sharing system. Utilizing a minimum of five years of historical data to develop the linear relationship, future overhead costs were determined with reasonable accuracy

by simply projecting a value of the independent (driver) variable (55). Although it was utilized as a negotiation and forecasting tool, PIECOST was not intended to replace the analytical activities performed by the cognizant contract administration service or DCAA personnel in their review of a contractor's forward pricing rate proposal (24:30). However, it would shorten the required time "by providing a means for highlighting those cost modes which show a changing level of incurrence [24:30]."

The actual benefits of the PIECOST methodology fell far short of what had been expected due to technical and behavioral problems. The technical problems resulted primarily from oversimplification of the model and from failure to accurately compile and input into the model historical, deflationary and projected data. As a result, meaningless information was often output from the model. The behavioral problems stemmed from the lack of understanding of the statistical aspects of the model and lack of support of those directing use of PIECOST and those tasked with implementing the system (34:11).

PIECOST was replaced in 1974 by a Refined PIECOST methodology which bore little resemblance to the original aside from the cost classification scheme (34:11). Refined PIECOST had its name subsequently changed to MODE, an acronym for Monitoring Overhead through Discrete Evaluations (32; 33). The MODE approach is a true cost analysis

technique. Its objective is to perform a complete evaluation of all overhead costs at the level in the contractor's organization at which the costs are incurred (39). Hence, many of the overhead expenditures are to be examined prior to their final grouping into the major overhead pools from which they will be applied to contracts. The MODE model is simply a data collection center for the many discrete cost evaluations performed on indirect costs in the course of a contractor's fiscal year. This methodology is much more logical and easily understood by personnel in the field than was the original PIECOST process (13). It involves, in essence, a "Should Cost" evaluation of overhead functions. The model itself, however, still remains somewhat cumbersome as it is designed to follow the contractor's entire overhead cost allocation system (51). The future of MODE is unknown, but it does not eliminate the inherent problems associated with trying to control and predict the large grouping of costs called overhead.

Another technique which has been proposed as a solution to this dilemma is that of advance overhead agreements (5). ASPR Section 15-107 encourages the use of advance agreements on particular cost items but does not cover the use of such an agreement for overhead costs as a whole. The use of advance agreements, which the researchers believe is a technique truly devoted toward cost avoidance, is a

call for a firm agreement of some type limiting the government's responsibility to bear future costs. Such agreements have been used for years in the Independent Research and Development (IR&D) and Bid and Proposal (B&P) cost areas (13).

The idea of using an advance agreement to cover the totality of overhead costs is not new. A DOD/NASA Overhead Study Group developed an Advance Overhead Negotiation Test Plan in the late 1960's. The purpose of the plan was "to test a technique of improving control of contractor overhead expenses by providing an increased incentive and motivation to the contractor [5:11]." The assumptions upon which the plan was based focused on incentivizing the contractor to act in accordance with his profit motive. Stated briefly, the agreement developed by this group called for the annual negotiation of selected final overhead rates in advance of incurrence based upon historical costs of preceding years and projected costs. The rates were variable depending upon fluctuations in the overhead allocation base (5:12). These variable overhead rates would also serve as the Forward Pricing Rate Agreement (FPRA). In effect, the advanced agreement amounted to a fixed price agreement on overhead, variable only as business volume varied. The agreement was to be tested on twelve defense contractors spanning all three service

branches and the Defense Contract Administration Service (DCAS) (5:20). While industry showed initial interest in the plan (112 contractors were surveyed), when the time came for a commitment only one contractor was willing to enter into such an agreement (5:27-28). The reason for this poor acceptance of the plan was that industry felt the plan had a number of major weaknesses which were considered disadvantageous to contractors. Among these reasons were:

1. The incentive was not commensurate with increased risk. Contractors contended that while the plan established a firm fixed price environment for overhead (in effect a 0/100 share ratio), it gave no recognition to increasing profit factors under weighted guidelines.
2. There was increased government involvement in the contractor's operations. Because the plan called for government involvement in the contractor's overhead budgeting process, a number of contractors felt that the government would interfere in internal operations.
3. The approach fragments the total cost concept and destroys flexibility. Contractors were very concerned that they would not have the necessary degree of flexibility needed in making management decisions affecting indirect costs.
4. There was no provision for costs beyond the control of contractors. Contractors feared that expenses such as union contract increases, taxes and the cost of floods and other casualties would not be recoverable.
5. Benefits to the contractor would only be short range. Significant underruns in the first year would be held against them in subsequent negotiations, thus making for tighter targets each year [5:Section VI].

Even the government had critics of the plan. Among their

concerns were: 1. the possibility of windfall profits; 2. cost migration from indirect to direct; and, 3. contractor gaming caused by multiple incentives (5:Section VI).

A major concern offered by both parties was the possibility of reverse cost motivation (5:37,39). This situation may be best described with an example. Suppose a contractor has the opportunity to reduce direct costs by \$1000 by making an investment which increases indirect costs by \$600. If the investment is made, the result is a decrease in total costs by \$400. But, because of the fixed price nature of his indirect costs caused by the advance agreement, the contractor may be motivated to forego the investment thus failing to reduce total costs to the government.

Due to the poor contractor participation, the Advance Overhead Negotiation Test Plan was cancelled. Yet, although not recommended, an alternative to cancellation was identified by the Overhead Study Group (5:49). This alternative was a modification of the plan. Many adjustments could have been made to answer contractor objections. Among those is

...the establishment of an 80/20 or similar share arrangement in lieu of the 0/100 share arrangement under the plan (which) would also have reduced their risk... However, any significant changes in the basic concepts of the plan that would make it more palatable to the contractor would have the effect of making it more disadvantageous to the government [5:49].

An arrangement very similar to the fixed price advance agreement described above was attempted more recently between the cognizant AFPRO and the United Technology Center with a similar degree of success (59). While the instrument for implementation was agreed upon, the contractor was unwilling to concur on specific overhead figures unless they were set sufficiently high to assure the receipt of an additional award of funds. Needless to say, an agreement of that nature would fail to offer any benefit to the government at all.

The final approach to be discussed is an award fee arrangement designed to incentivize contractors to control indirect costs. Although it was never fully implemented, the Overhead Incentive Premium Award Plan developed by Headquarters AFCMD is an excellent example of utilizing such a concept (47:1). Under the plan, the Administrative Contracting Officer (ACO) would submit an offer to the contractor which would describe the details of the award fee. Included would be the total dollar award which could be potentially earned, the criteria which would be used by the ACO to determine the actual amount of the award fee, and, as in all award fee arrangements, a statement expressing the finality of the unilateral award decision of the ACO. The contractor is, thus, made aware of an additional fee which he can earn simply by meeting the

criteria stipulated by the ACO. This particular plan called for financing of the award fee through an adjustment to the contractor's General and Administrative expense rate which is subsequently applied to all contracts (47:1). While this method does provide a direct monetary incentive to the contractor by offering additional fee above and beyond that contained in the contract, it provides no penalty for poor overhead management (14:26).

Direction of this research. In reviewing these methods and procedures developed to control overhead costs, it becomes clear that DOD is sincere in its desire and need to control this large cost element. Each of the plans presented above has its benefits and its shortcomings. Some have yet to be fully tested.

The largest and most comprehensive study into the problem of controlling indirect costs was that conducted by the Overhead Study Group in the late 1960's. Its recommendation was to utilize an advance agreement; but, the Group's specific approach met a number of obstacles which caused the cancellation of the Advance Overhead Negotiation Test Plan (5:Section VI). The authors believe that this plan may have been cancelled prematurely since the alternatives to a strict fixed price arrangement were not fully

investigated (5:49). Additional support for an advance agreement can be found by reviewing its benefits. Among these benefits are:

1. It would necessarily improve the contractor's budgeting practices (5:26);
2. If utilized, advance agreements would allow a much more timely settlement of final overhead rates. Currently this settlement lags up to three years, or longer in some cases, from the close of the contractor's fiscal year (1:47-49; 5:25; 20:1-3);
3. If advance agreements are used, the complex question of cost reasonableness can be determined before-the-fact since the contractor will know in advance what his cost recovery will be (5:24); and,
4. Advance agreements are very complementary to the concept of cost avoidance which is a specific element of the USAF policy on overhead (62:28).

As shown below, the call for increased incentives in the overhead area comes from both government and industry. In 1973, AFSC's Project ACE (Acquisition Cost Evaluation) stated the problem as follows:

Overhead (i.e., "indirect") costs account for a substantial portion of AFSC procurement expenditures and show few signs of decreasing. There is a need to improve incentives for contractors to reduce these costs. The after-the-fact approach to settlement of contractors' overhead costs does not provide an adequate method for insuring that such expenditures are kept within reasonable levels. Advance overhead agreements offer significant opportunities for substantial reduction in indirect costs [54:21].

Headquarters, Aeronautical Systems Division, Air Force Systems Command has also recognized the potential use of incentive arrangements for overhead cost control (21:1). Industry has voiced its support for incentive arrangements

through the National Security Industrial Association. In its 27 August 74 letter to Deputy Defense Secretary Clements, it recommended the use of advance agreements. It also stated that a tangible incentive for controlling overhead should be a basic feature of the advance agreement (14:26).

The Advance Overhead Negotiation Test Plan granted the ultimate incentive to contractors with its fixed price arrangement. At the same time it passed on total risk to the contractor which was the basic reason it was rejected by industry.

This research examined the findings of the Overhead Study Group and analyzed a modification to the plan as originally designed. The analysis included a concept developed by Captain William S. Curry, Chief of the Business Management Branch, Detachment 16, Air Force Contract Management Division, AFPRO Rockwell International Electronics Operations (14). Curry introduces a percentage sharing arrangement such as an 80/20 government/contractor share of costs above and savings below a target agreed upon in an advance overhead agreement. The introduction of this share line or "incentive" feature may have a dramatic impact on the acceptability of an advance overhead agreement by government and industry alike.

In light of overhead's magnitude and the attention given to it at high governmental levels, it is important

that the advance incentivized overhead agreement be investigated. Only if all alternatives are fully evaluated can the optimal approach to the control of billions of dollars in indirect costs be found.

Research Objectives

The objective of this research is to contribute to the knowledge of techniques which may be used to control defense contractor indirect costs. In a sense this study serves as a gathering of ideas and theory pertaining to the mechanics, impact, advantages and disadvantages of an advance incentivized overhead agreement. Succinctly put, the goal of the research is to determine if an advance incentivized overhead agreement would be successful in motivating defense contractors to control overhead costs. In meeting this goal, the study provides government procurement personnel with information which will aid them in deciding the acceptability or unacceptability of such an arrangement.

Scope

While it is always desirable to call upon empirical evidence in support of research of this type, such evidence was unobtainable primarily for two reasons. First, the theory surrounding an advance incentivized

overhead agreement had not been sufficiently developed and disseminated to the point where the government and industry would be willing to enter into such an agreement on a trial basis. Therefore, it is impossible at this time to compile comparative data. Secondly, even if a pilot study of this nature had materialized at the start of this research, the time period required for the experiment to be completed (at least one contractor fiscal year) would extend beyond the time limitations which constrain this research. The study, then, is restricted to a theoretical discussion of an advance incentivized overhead agreement.

Due to the greater familiarity of the researchers with the Air Force procurement organizations and procedures, this research was conducted using examples and terminology which has been derived strictly from within the Air Force. This fact by no means limits the discussion and findings to Air Force procurements. The general nature of the subject should make it applicable DOD-wide.

Investigations pertaining to the methods used currently to control overhead and to the impact of an advance incentivized overhead agreement has been restricted to major defense contractors, such as Rockwell International B-1 Division or the Hughes Aircraft Company. For the purposes of this research a major defense contractor is defined

as a cost and profit center which has at least fifty per cent of its business base made up of defense contracts, which has a government contract relating to a portion of a major defense system as defined by the DOD Directive 5000.1 (56), and which routinely enters into Overhead Forward Pricing Rate Agreements with the government Contract Administration Office (CAO).

Investigation was not made into the peculiar aspects of arrangements made with foreign firms, American firms dealing primarily in Foreign Military Sales or government owned-contractor operated (GOCO) facilities. Also, the research was not intended to be limited to either production or research and development oriented contractors.

Assumptions and Limitations

In the analysis and discussion of the advance incentivized overhead agreement, procedures and techniques are mentioned which are not acceptable under current procurement laws and regulations. It is the intent of this research to review a methodology new to the procurement world and, therefore, the researchers have assumed that changes in the procurement laws and regulations are feasible and justifiable in order to implement an advance incentivized overhead agreement.

In addition, a premise upon which any incentivized type of arrangement is based is that a firm's actions can

be motivated by a desire to increase profits. Any discussion of an advance incentivized overhead agreement relies on this premise.

One final assumption, one that is very critical to this topic, is that the cost avoidance concept is sound. Briefly stated, this concept assumes that it is much easier to influence contractor decisions pertaining to the incurrance of unreasonable overhead costs than it is to reach a satisfactory settlement on the recovery of unreasonable expenditures after they are incurred.

The four factors listed below constituted limitations to the conduct of this research effort.

1. The advance incentivized overhead agreement as developed in this study has not been tested by the government with a defense contractor. Therefore, the conclusions of this research are based on a theoretical evaluation of the concept rather than upon the findings of an actual application.
2. Due to the limited development and exposure of the subject matter, the findings of this study are the result of inputs from a relatively small sample of government personnel. As the theory of the advance incentivized overhead agreement becomes more widely disseminated, additional advantages and shortcomings will surely be identified.
3. Defense contractor remarks and opinions on this approach toward controlling overhead costs were not solicited in this study. Any conclusions of this study regarding the acceptability of the advance agreement by industry is certainly limited by this factor.
4. Finally, no investigation was made of the legal ramifications of the use of an advance agreement of this type. Deviations from applicable regulations may be required for its use.

Research Questions

In order to fulfill the objective stated above, the following research questions became the focus of the investigative efforts:

1. What are the strengths and weaknesses of existing government overhead monitoring systems?
2. How can an advance incentivized overhead agreement be structured to stimulate the profit motive?
3. What are the strengths and weaknesses of an advance incentivized overhead agreement?
4. Do the advantages of an advance incentivized overhead agreement as weighed against its disadvantages and those of current methodologies sufficiently improve the control of overhead expenditures to warrant its adoption by DOD?

Research Method

The impracticality of utilizing empirical data in this research effort has been previously discussed. The limited development of the advance incentivized overhead agreement concept combined with the lack of widespread knowledge on the subject severely confined the research methodologies available. In short, the approach of this effort was restricted primarily to the review of reports, books, regulations and policies combined with personal interviews of government personnel who are versed in the control and nature of overhead costs and the mechanics of incentive type contractual arrangements. In addition, much

attention was paid to those individuals who have already delved into the theory of advance incentivized agreements of this type. These individuals were identified by contacting organizations in the Air Force which have overhead responsibilities. The procedure was to contact the chiefs of these organizations for comment or reference to other personnel. Additionally, a concerted effort was made to obtain documentation from these organizations which reflect the official position of the organization regarding the use of an overhead arrangement of this type.

Specifically, each of the four research questions was addressed in a different manner. Question one, which pertains to the nature of indirect costs and the strengths and weaknesses of current methodologies used by the government to monitor indirect costs, was answered primarily with a review of literature on the subject. Cost accounting procedures which contractors use to manage these costs were obtained from current books written by recognized cost accounting experts, such as Charles T. Horngren and Robert N. Anthony. Current government efforts to maintain control of overhead costs were identified by a review of procurement regulations and policies and by interviews with personnel responsible for managing government surveillance of indirect costs. The strengths and weaknesses of government efforts to control these costs were researched from literature on

the topic and from contacts with government personnel currently in the overhead management field. As a baseline from which to evaluate the control process, criteria specified by Horngren and Anthony were used.

Fundamental to the control process is the ability of the management control system to relate resources to the organization's objectives. The overhead control system used by the contractor and the government should assist in providing control over indirect activities (3:199).

A characteristic identified by both Anthony and Horngren is that an objective of the control system should be to reinforce goal congruency throughout the organization (3:5; 28:13). The authors took this characteristic one step further by stating that the overhead control process should identify and emphasize an objective which is congruent with the goals of both the contractor and the government.

Additional objectives of a control system are: 1) to provide a means of communicating the desired results of the activity; 2) to motivate the accomplishment of goals as effectively and efficiently as possible; and, 3) to aid in the diagnosis of alternative means of accomplishing an organization's task (3:199-200). These objectives should be met through the use of a single, integrated control process which follows a definite, rhythmic pattern and timetable year after year (3:6). These objectives are characteristics of a good overhead control system.

A final factor which was considered in evaluating an overhead control system is based on recognition of the discretionary nature of many overhead functions. For these types of functions, "costs are controlled primarily by deciding what tasks should be undertaken and what level of effort is appropriate for each [3:206]." The ability of an overhead control system to accomplish these evaluations is, then, a parameter upon which to judge its quality.

The second research question was answered using two methods. First, discussions were conducted with twelve DOD managers, seven of which have already contemplated the use of an incentive arrangement of some type for the control of indirect costs. Among the organizations which were contacted are the following:

- Overhead Management Division, Directorate of Pricing and Contract Management, DCS Procurement and Manufacturing, Headquarters Air Force Systems Command;
- Contractor Overhead Division, Directorate of Contract Administration, Air Force Contract Management Division (AFSC);
- Directorate of Procurement and Production, Aeronautical Systems Division (AFSC);
- Air Force Plant Representative Office, Rockwell International Electronics Operations;
- Air Force Plant Representative Office, Hughes Aircraft Company;
- Air Force Plant Representative Office, United Technology Center;
- Air Force Plant Representative Office, General Dynamics, Convair Aerospace Division.

While the possibility of developing a questionnaire to be sent to each of these organizations was entertained, it was determined that greater success would be accomplished in obtaining meaningful feedback on the topic if personal or telephone interviews were conducted with members of these organizations. Personnel who could provide meaningful feedback could be much more easily identified and contacted on that basis. A standard format was followed in each interview.

Topical areas which were covered include the following:

- Objective of research;
- Discussion of previous attempts at arriving at advance agreements together with reasons why they failed;
- Discussion of the Advance Incentivized Overhead Agreement concept;
- Interviewee's familiarity and experience with overhead management and advance agreements;
- Discussion of alternative methods of structuring the agreement including share line construction, contractual arrangements, bases for incentives, methods of funding, and penalty and reward considerations in follow-on years.

Each of the topical areas was addressed using an unstructured interview approach. The results were then used to develop a data base from which ideas and perceptual evaluations of the advance agreement technique were extracted.

The second method was a detailed review of any documentation found in these same organizations pertaining to previous attempts/failures to enter into advance overhead agreements of any type. The section of the bibliography entitled "References Cited" lists the documents that make up the

population of this review.

Synthesis of these inputs enabled the development of a model advance incentivized overhead agreement. An application of this model in a hypothetical situation is presented in Chapter 3.

The answer to research question number three logically follows the development of the advance incentivized overhead agreement. Determination of the model's strengths and weaknesses was largely made by a comparison with those of current methodologies and of previous attempts to develop any type of advance and/or incentivized overhead arrangement and with the characteristics of sound control systems.

Finally, the consideration of the answers to questions one and three were critically reviewed and weighed in order to determine whether or not a recommendation could be made pertaining to the use of an advance incentivized overhead agreement by the DOD.

Organization of the Study

In the following chapters, information is presented which will lead to answers to the research questions stated above. Discussed in Chapter 3 is the nature of overhead costs to include how overhead is applied to defense contracts and how overhead matters are currently being handled. The structure of an advance incentivized overhead agreement will be the subject of Chapter 3. In Chapter 4, a detailed

analysis of an advance incentivized overhead agreement will be offered. Finally, in Chapter 5, conclusions and recommendations pertaining to the concept of this new overhead arrangement will be drawn and presented.

Chapter 2

CURRENT ACTIVITIES IN THE CONTROL OF OVERHEAD COSTS

The control of overhead costs is an important concern of military procurement agencies. As such, it is an area which is monitored by a number of government personnel in each contractor's plant (23:2). However, the primary responsibility for the control of overhead expenses lies with the contractor's management (23:3). In order to gain a full understanding of the factors which influence the control of indirect costs, it is necessary to examine the role each of these parties plays in the overhead control process. This chapter will present a summary of the accounting procedures used by firms to record and allocate overhead expenses. A subsequent discussion of the government's overhead monitoring system will follow. Finally, the strengths and weaknesses of the government's monitoring system will be identified.

Indirect Costs Within a Firm

Indirect Costs Defined

Costs can be defined as either direct or indirect. The distinction between the two types of costs lies in the

element of their traceability. A direct cost is specifically identified with a given cost objective or product. Indirect costs, on the other hand, either cannot be traced or are of such a small magnitude that they are not worth being traced to this level (28:30). Spillers makes the distinction by defining overhead to be all costs except raw materials and direct labor, resulting in the view of overhead as a residual pool of costs which must be allocated to cost objectives (49:211; 36). Therefore, overhead costs cover a broad spectrum.

The category of overhead costs can be further divided into fixed, variable and semivariable components (58:5A22). These categories of indirect costs are depicted graphically in Figure 2.

Fixed expenses (Figure 2A) are those which do not vary with the volume of production in the short run (within the limits of plant capacity). Examples of fixed costs are depreciation and rent expenses. These expenses remain at a constant level for a given time period regardless of the output produced (58:5A22). Variable expenses (Figure 2B) are those which vary proportionally with increases or decreases in production. Indirect labor and employee fringe benefits are examples of variable expenses (58:5A23). Semivariable expenses exhibit both fixed and variable properties. They may be fixed over a very narrow range of production and increase in a stepwise manner as shown in Figure 2C (58:5A23).

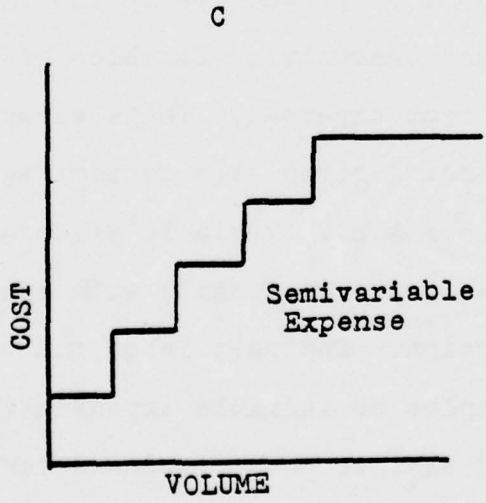
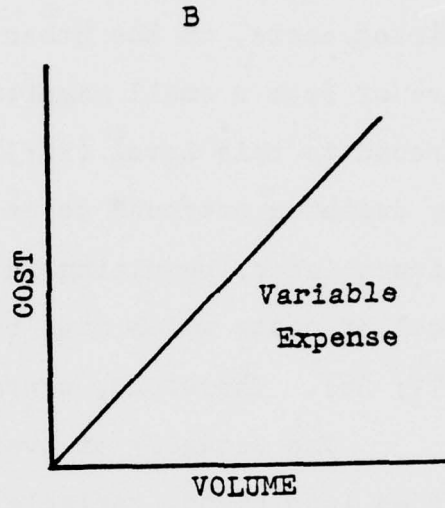
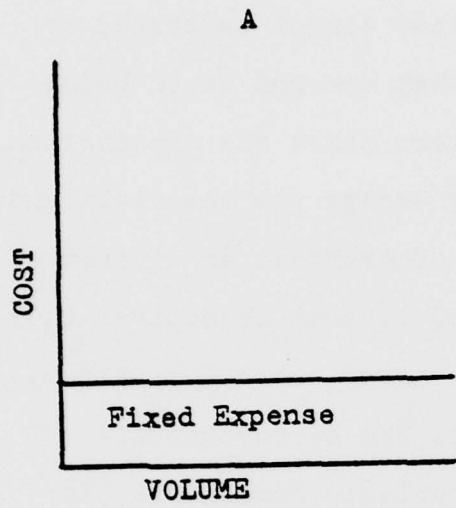


Figure 2 - Indirect Cost Behavior Patterns

While semivariable costs are often categorized as a separate type of cost, they can normally be broken down into fixed and variable components over a defined range of volume.

Indirect Cost Allocation

Cost centers. Cost centers can be defined as accounting units in which costs are accumulated. It may be a department but there is no necessary connection between cost centers and departments (2:365). Cost centers can be further defined as either product centers, service centers or administrative centers. A product center is one which has direct contact with the item being produced. An example of a product center is an assembly department. A service center, however, is one which incurs costs but which does not actually work on the product itself. Maintenance departments normally fall into this category (2:365). An administrative center is one that "...performs administrative functions that benefit the organization as a whole [4:23]. General and Administrative (G&A) expenses (including costs such as the office of the President of the company) normally make up an administrative center. Overhead pertaining to product and administrative centers are frequently referred to as major overhead pools while service centers are commonly called support overhead pools.

The allocation process. Indirect costs by their very nature are not traced to any particular cost objective. In order to apply indirect costs to a product, thereby making them recoverable, it is necessary to have some method of cost allocation. There are four steps in the process of indirect cost allocation:

1. Indirect cost expenditures are estimated for each major and support overhead pool.
2. The estimated costs accumulated in support pools are then transferred to the major overhead pools.
3. The total accumulated in each major overhead pool is divided by an estimate of activity (base) giving an overhead rate.
4. Using this rate indirect costs are allocated to each product passing through the product cost center or deriving benefit from the administrative cost center (2:365).

The first three steps of this process are carried out prior to the beginning of the year. The indirect costs which are applied to products, therefore, are estimates of what will actually be incurred rather than concrete figures based upon historical accounting records (2:365). Hence, the indirect rate used for application is also an estimate. The difference between the volume of business, the overhead costs and the rates which are actually experienced and these estimates is identified at the end of the accounting period. Appropriate adjustments are then made (28:501).

Estimating indirect costs. The process of estimating

indirect costs takes place during the budget cycle. Costs are budgeted for a firm by each overhead pool based upon the planned activity of that pool. Consideration must be given to historical costs, cost trends and any changes anticipated in costs and volume of activity. The budget will establish, in advance, a target amount of expenditure which is based upon an anticipated level of production (49:684).

Some firms use a flexible budget. This type of budgeting process projects the costs which are likely to be incurred for several levels of output. The actual budget or target is then determined after a specific level of output is experienced. The flexible budget provides a better indicator of anticipated costs and is a more useful tool in planning and controlling these costs (49:685). An overhead budget is thus prepared for each pool.

Transfer to major overhead pools. Once the estimated costs have been accumulated in the overhead pools, the costs of the support pools are transferred to the major pools either directly or through a series of intermediate allocations via other support pools. The transfer can be accomplished by either direct charge or allocation. Using the direct charge method, costs are charged at a prespecified rate for those services which are provided. This method could

be used by a maintenance department which charges the major pool based upon time spent repairing a particular piece of machinery (2:366). Using an allocation process, costs are distributed to the major overhead pools based upon derived benefits or upon the "fair share" of the costs (2:367; 57:Section 15-203). For example, the same machine maintenance department may allocate 30% of its cost to a given overhead pool because that pool contains 30% of the total number of machines.

Once the costs have been accumulated in each major overhead pool, the final step is to allocate the overhead to each unit of output being produced. This step is accomplished by dividing total overhead costs by an activity base. The result is a final overhead rate which is then applied to each unit. Using this rate, overhead costs become a part of the total cost of producing that unit (29:415).

Activity bases. Whenever costs are allocated, whether it be from a support pool to a major pool or from a major pool to the unit being manufactured, there must be some equitable basis used for the allocation.

In general, the base that is to be used for allocating indirect costs should have the following characteristics:

1. It should produce a rate that will result in an equitable allocation of the indirect costs among the various cost objectives.
2. It should be applied consistently from year to year and cost objective to cost objective.

3. It should be in accord with generally accepted accounting principles and the particular cost accounting standards applicable in the circumstances [4I:20-21].

A number of bases are available to the firm for this function. Three of the more commonly used bases for the application of product center overhead to a product are described below.

One base is the total activity or number of physical units produced. An allocation procedure using this base requires the application of a flat overhead rate to each unit of output which passes through a product center. This method is best used when the products are homogeneous and receive the same treatment in the product center (29:414). For example, assume a product center, call it a manufacturing department, worked on one type of product all year. Over the course of the year, the department should complete exactly one thousand units. Also assume that this manufacturing department is estimated to incur \$50,000 in overhead costs within the department and should receive an estimated \$20,000 which is allocated from service centers such as maintenance, data processing and reproduction departments. Therefore, a total of \$70,000 is estimated to make up this manufacturing department's overhead pool. The overhead rate is calculated as follows:

$$\frac{\text{Pool}}{\text{Base in Units}} = \text{Rate} \quad \text{or} \quad \frac{\$70,000}{1,000 \text{ Units}} = \$70/\text{unit}$$

Thus, \$70 of overhead is applied to each unit passing through this manufacturing department.

Another possible basis of allocation is the amount of direct labor expended. Using this base, an allocation can be made by dividing the budgeted overhead cost by the anticipated number of direct labor hours to be used in the product center. From this calculation a rate is produced which is applied to each unit based upon the number of direct labor hours involved in its production. If direct labor rates are uniform, the same result can be obtained by using direct labor dollars as the base (41:24).

Machine hours is a third base which often is used in the allocation of overhead costs. This base is used by dividing expected costs by the number of machine hours to be used in a product center. The result, again, is a rate which is applied to the units of output based upon the number of machine hours expended in the production of each unit (29:414).

For an administrative center, the base could be total sales, cost of sales, input to work in process or some other all-encompassing index (41:24-25). For example, G&A expense (the cost of an administrative center and major overhead pool) could be applied to each product as a percentage of all other costs applied to a product being manufactured at a given facility. Assume indirect costs

in the amount of \$50 million is expected to accrue in the G&A pool. Also assume that expected input to work in process (all costs at a facility excluding G&A expense itself) is \$250 million. Then G&A expense would be applied to all items being produced at that facility based on a rate of 20% ($\$50 \text{ million} / \250 million). Thus, if an item cost \$500 to produce, an additional 20% of the \$500 or \$100 would be added to the cost of that item yielding a total cost of \$600.

By reviewing these examples, one can easily understand the basic operation of overhead cost allocation procedures. A very critical factor to grasp is that the allocation should be made upon a meaningful and equitable basis to assure the proper costing of the units which are produced (28:494).

Since the allocation of overhead costs during a contractor's accounting period is based on estimated cost and base figures, the actual year end overhead rates will most often differ from those used throughout the year (28:501). The two rates may differ due to changes in base figures, cost incurrence levels, or both (28:499). When this occurs, a variance analysis takes place to determine the causes of the differences (28:499).

Whatever the reason, a difference in estimated and actual overhead rates will result in an over/underapplication

of overhead costs. That is, too much or, respectively, not enough overhead has been applied to the items which were produced during the accounting period (28:501). To correct this condition an accounting adjustment is made which eliminates the discrepancy (28:501). As a result, the overhead portion of the costs of jobs which had been worked on during the year are recomputed to reflect the actual overhead rate. On completed FFP type contracts, the impact of the over/underapplication of overhead costs is totally borne by the contractor. On cost reimbursement or FPI type contracts the costs impact may be shared between the contractor and the government. When overhead adjustments are unfavorable (i.e. an upward adjustment in cost) and where such an adjustment cannot be compensated for within funding constraints by management corrective actions, a contract overrun will occur.

The Overhead Monitoring System

The ultimate goal of DOD procuring agencies is to gain control over system acquisition costs (23:2). As pointed out in Chapter 1, overhead costs may account for up to two thirds of all in-plant costs associated with procurement of major defense systems. Therefore, the control of these costs is a major concern of the DOD.

Each of the following tasks is an important step

toward obtaining control of indirect costs.

1. Determine that each indirect function is necessary and that the methods used to accomplish the functions are beneficial from a total cost effectiveness standpoint;
2. Establish the reasonableness of the proposed costs of acceptable indirect functions before the costs are incurred;
3. Assure that actual costs are in reasonable agreement with approved planned costs [23:3].

These are the tasks assigned to government monitoring teams which are responsible for monitoring contractor indirect costs.

The Monitoring Team

The team is principally composed of three members from the Contract Administration Office but other personnel in the contract management functions are also involved. The three members are the overhead monitor (normally the Administrative Contracting Officer or his designated representative), the contract auditor, and the industrial engineer (23:28). The overhead monitor directs this team of specialists. He is responsible for activities which fall into three main categories: 1. The negotiation of overhead forward pricing rate agreements (FPRA) with the contractor; 2. Evaluating changes to the FPRA; and, 3. Final settlement of overhead rates (23:29-31).

The overhead monitor acts as the government focal point for all matters pertaining to these activities. His

duties include obtaining proposals from the contractor and distributing them to other members of the monitoring team for evaluation. Accordingly, he is responsible for compiling inputs pertaining to the acceptability of the proposal from the monitoring team (23:31).

After extensive factfinding with the contractor, the government team prepares a negotiation position based upon their evaluations and findings. Subsequent negotiations with the contractor result in an agreement with respect to overhead rates which will be either published in an FPRA or used in the final settlement of overhead for a given fiscal year, whichever is appropriate (23:29-31). Final overhead rates are sent to government buying agencies to allow the closeout of physically completed contracts. Publication of forward pricing rates in an FPRA is required so that the various buying agencies can utilize those rates in the pricing of new procurements. It should be noted that while the rates which are agreed to for final settlement of overhead are binding, those used in an FPRA are not. The reason for this is that the FPRA is, as the title indicates, an agreement and not a contract. It may be cancelled by either party when the rates contained therein no longer reasonably approximate the rates actually being incurred (57:Section 3-807.12).

Finally, the overhead monitor must observe the contractor's operation to ensure that the current FPRA continues

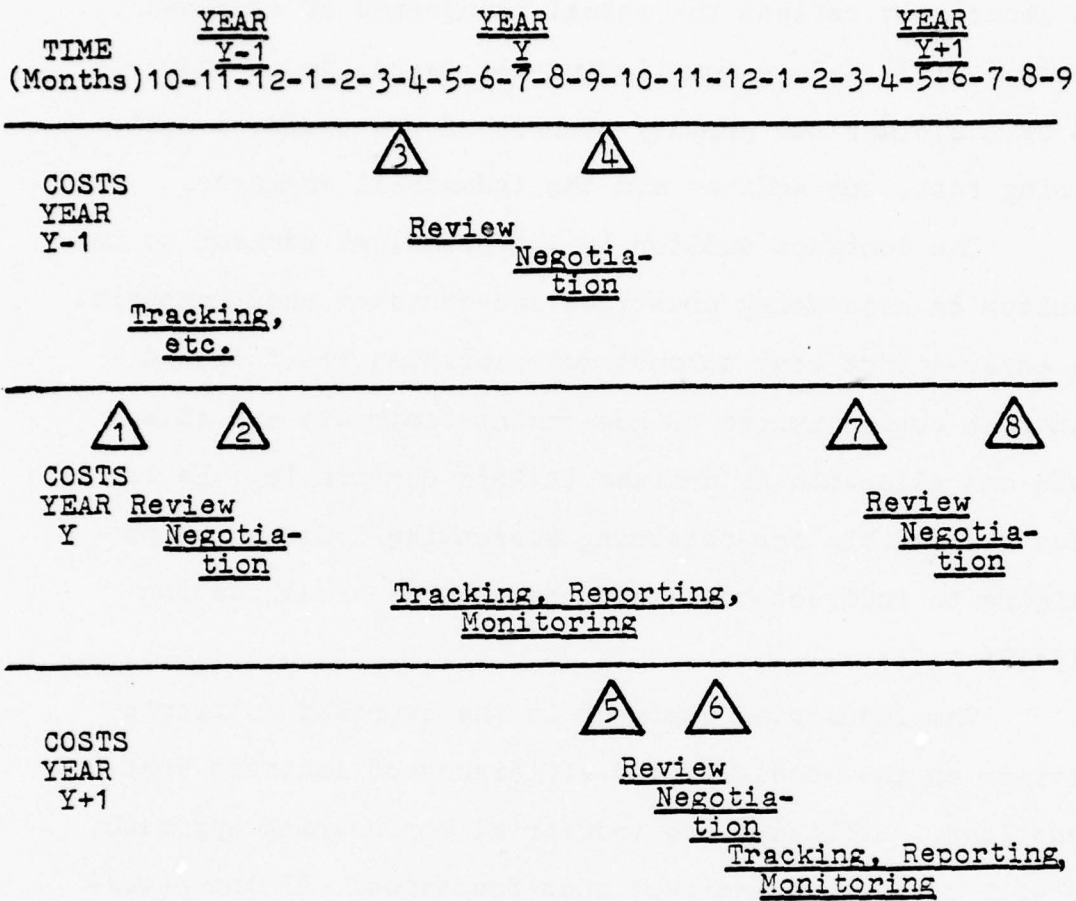
to accurately reflect the actual incurrence of overhead costs (23:31). In accomplishing his tasks, he is supported by the other two primary members of the overhead monitoring team, the auditor and the industrial engineer.

The contract auditor is the principal advisor to the monitor on accounting practices and contract audit matters. He ensures that cost accounting principles are followed and that costs charged to government contracts are allowable and allocable as defined in ASPR Section 15. He is also responsible for obtaining accounting information pertaining to indirect costs and their bases of allocation (23:29; 1:11).

The industrial engineer is the overhead monitor's advisor on the necessity and efficiency of indirect cost functions. Utilizing the industrial engineering approach, he will review the indirect cost functions. If the necessity or efficiency of a given function is questionable, he will inform the monitor so that the matter can be brought to the attention of the contractor for possible corrective action (23:30).

Review Cycle

All of the functions performed by the overhead monitoring team take place on a regular cycle. An ideal cycle begins about three months prior to the operating year (23:26). Displayed in Figure 3 is an example of this cycle for a



Event

- 1 Contractor submission of proposed forward pricing rates for year Y.
- 2 Negotiation of FPRA for year Y.
- 3 Contractor submission of proposed final rates for year Y-1.
- 4 Negotiation of final rates for year Y-1.
- 5 Contractor submission of proposed forward pricing rates for year Y+1.
- 6 Negotiation of FPRA for year Y+1.
- 7 Contractor submission of proposed final rates for year Y.
- 8 Negotiation of final rates for year Y.

Figure 3 - Flow Chart of Monitoring Functions For Year Y (23:27)

hypothetical fiscal year Y (23:27). The cycle begins in month 10 of year Y-1. At this time, the contractor submits his proposed overhead rates for year Y (and normally for up to four additional years into the future) to the monitor. The team reviews the proposal and the overhead monitor negotiates an FPRA prior to the beginning of the operating year. During the year the team tracks, reports and monitors overhead costs and bases to insure that the rates used in the FPRA approximate actual rates. During the third month of year Y+1, the contractor submits his proposal for the final settlement of the overhead for year Y. The team reviews this proposal and negotiates final rates by the end of month 8 of year Y+1. It can be seen that this process is an overlapping one. It should be emphasized that the milestones shown in Figure 3 are targets and that there will be some flexibility and slippage as necessary (23:28).

The overhead monitoring process as described here has as an objective the timely identification and correction of problem areas. In order to obtain the maximum benefits of the cost avoidance philosophy, negotiation on problem areas should not take place months or years after the costs have been incurred (23:28).

Evaluating the Reasonableness of Volume Projections

As described previously, the overhead rate published

in an FPRA is a ratio of estimated overhead dollars to a projected activity base. In evaluating the accuracy of these estimates

The most critical factor...is how well the firm forecasts its future level of operations (volume), because the estimates of the indirect costs and the bases are usually derived from this estimate.

If the firm estimates its volume too low, rates will usually be overstated. The result of this is for work which is priced using these rates to be overpriced. Conversely, if the volume is estimated too high, rates will usually be understated. Here, the result is for work priced using these rates to be underpriced [41:25].

While neither overstated nor understated rates are desirable, a contractor will tend to favor a conservative volume estimate since it provides him a hedge against underpricing (41:25). Therefore, the government monitoring team must assure that the volume projections are reasonably accurate.

A number of techniques are utilized to perform an evaluation of the contractor's volume projection. Among these are:

1. An analysis of the contractor's budget (if available), since budget figures would most likely contain the contractor's best estimate of sales;
2. A query of government buying agencies having a substantial amount of business with the contractor for information pertaining to pending or contemplated awards;
3. Observation of trends in sales and size of labor force (there should be a direct correlation between these two factors); and,

4. An analysis of the contractor's breakeven level to assure the volume forecast is at a level sufficient to preclude a loss (41:30-31).

Also, since overhead cost is managed on a facility-wide basis, it is necessary to consider any commercial business which might be performed at a facility as well as the government work.

Once a sales or volume forecast is determined, appropriate levels of activity (direct labor hours, machine hours, etc.) to be used as bases for overhead allocations can be derived. These base levels become factors which enter into the evaluation of the reasonableness of the budgeted overhead costs.

Evaluating the Reasonableness of Budgeted Costs

A cost can be recovered on a defense contract if it is determined to be allowable, allocable and reasonable (57:Section 15-201). While the criteria for allowability and allocability are fairly well defined in ASPR, only vague guidelines are given for determining the reasonableness of contract costs (57:Section 15-201.3). Therefore, it is in the determination of the reasonableness of overhead costs that the monitoring team expends most of its efforts. There are three methods which the overhead monitor uses to determine if a cost is reasonable: 1. a comparative analysis; 2. an engineering analysis; and,

3. a combination of these two (23:28; 7).

Comparative Analysis

The simplest of the three methods is the comparative analysis technique. The comparative approach requires a comparison of the projected costs with another data point, usually historical costs (23:46). The reasoning behind this technique is that properly adjusted historical costs can be a sound basis for predicting future costs. There are two methods of comparison commonly used: dollar amount and ratio comparison (23:46).

Dollar amount comparisons can be used on those costs which do not vary with fluctuations in the level of activity (base). In other words, this technique is used primarily for analysis of fixed costs. Because these costs often do not vary significantly from year to year, it is easy to compare properly adjusted figures from one year with previous years (23:47). The problem with this approach is that many of these costs are discretionary in nature. As a result, the need for the costs is not readily apparent since a need for any particular cost or function in one year does not indicate that the same is justified in the following year (23:47).

Ratio analysis, on the other hand, is performed on variable costs. It is applied when a given cost is expected to exhibit a constant relationship to other costs and to a

unit of activity from year to year. The difficulty of this technique is in assuring that each year's costs are measured on a common basis. Factors which should be considered when attempting to establish comparability of costs are inflation, reclassification of costs, and changes in methods of operation (23:48).

Inflation has a great effect on the accuracy of comparing costs over time (45:5). Costs, therefore, tend to be incomparable from year to year unless the effects of inflation are removed from the data. To overcome this problem one should deflate these costs so that comparisons can be made in constant year dollars (45:5).

The reclassification of costs from direct to indirect (or vice versa) also affects the reliability of cost comparisons. The problem of reclassification can be overcome by adjusting the costs of the base year to show what they would have been had the reclassification been in effect during that year (23:49). The effects of changes in methods of operation are accounted for in a similar manner (23:50).

Engineering Analysis

The industrial engineering approach is the second means of evaluating cost reasonableness. It is used to supplement a comparative analysis and is not intended as a replacement (23:54). Basically, industrial engineering seeks to answer three questions:

1. Why is a function being performed?
2. How is the function being performed?
3. How efficiently is the operator performing the function? [23:55].

The first question focuses on the necessity of the function. If an overhead cost function is not necessary then it is not a reasonable cost (23:56). If a function is determined necessary then the method of performance must be examined.

The second element of the industrial engineering approach focuses on the methodology used to perform a necessary function. Factors to be considered in this step include location, resources employed, work flow and timing. By analyzing the method used to perform a function, the efficiency of the method can be evaluated (23:57).

The efficiency of a method used to perform a function is a monetary or physical measure of the output of a given function in relation to the inputs or resources used to accomplish its objective. An inefficient method of performing a function indicates that the costs are not reasonable (23:57).

It is obviously beyond the capabilities of the government industrial engineer to review each of the contractor's functions. This complete analysis is reserved for the contractor's industrial engineering staff (23:60). However, in order to assure that this task is carried out properly and

to gather inputs for the negotiation process, the government industrial engineer reviews selective areas.

There are three factors which are considered for identifying those functions to be investigated: 1. dollar amount; 2. controllability; and, 3. definability (23:57). The engineering analysis efforts will be most productive when they are concentrated on high cost areas, on functions over which a contractor can exercise control and on functions which have a definable and quantifiable output (23:58-59).

How an industrial engineering effort would be performed is shown in Figure 4 (23:61). First, low cost or non-controllable functions are eliminated from consideration for engineering analysis. Those of high cost or high degree of controllability are classified for definability. Those with quantifiable output (definable) have engineering standards developed. Earned hour reports are made on these functions. Earned hours are the product of the standard hours times the units of output (23:60). Any variance is subjected to variance analysis and if necessary a recommendation for revision of standard is made to the contractor. If the function is non-quantifiable, it is subjected to goal achievement standards and milestones. The variances from these functions are also subjected to analysis, the findings noted, and a similar recommendation may be made

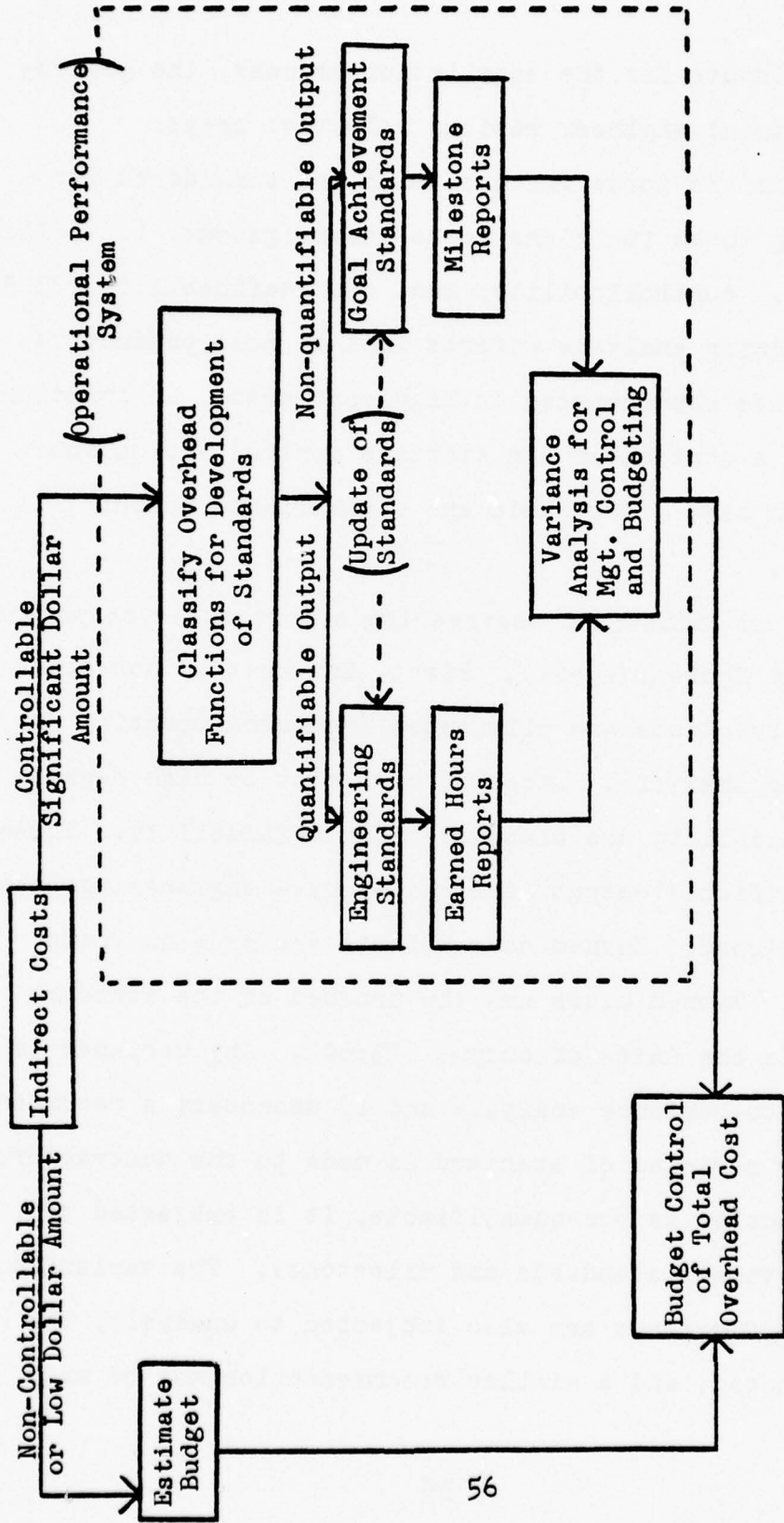


Figure 4 - Industrial Engineering Analysis (23:61)

for revision of the milestones (23:60). The proper conduct of engineering analysis is an important step in assuring the reasonableness of the contractor's overhead costs.

MODE

As stated in the previous section, the comparative and engineering analyses are not intended to be mutually exclusive approaches toward evaluating the reasonableness of overhead costs. One methodology which utilizes both approaches is MODE (13). This methodology employs a computer model which is designed to trace overhead costs from the point at which they are incurred (contractor departments, service centers, product centers, etc.) through the contractor's entire overhead cost allocation system to the major overhead pools from which costs can be applied to individual units of production (51:Attachment 1).

At any level in the allocation system, output can be obtained which displays the appropriate summary of proposed overhead costs. More specifically, a summary of costs proposed for each service, product, or administrative cost center can be obtained by querying the model (10). The model contains historical data for at least one year along with figures representing costs contained in a current FPRA proposal. By comparing historical costs (adjusted for inflation) with proposed costs, identification of areas which are obviously out of line is possible (51:Attachment 1).

Hence, a comparative analysis is accomplished.

It has been previously noted, however, that a comparative analysis is meaningful only if the year to which a proposal is compared reflects an efficient level of cost incurrence. Fundamental to the MODE methodology is the accomplishment of discrete evaluations of overhead costs using the industrial engineering approach at the level in the contractor's organization where the decision to incur the overhead cost is made (9:Charts 21&32; 39:1). In a sense, it is a "Should Cost" study on overhead. By performing these evaluations, the shortcomings of doing a comparative analysis alone are mitigated.

After all comparative and discrete analyses are accomplished, exceptions to proposed cost amounts may be entered into the computer model. The allocation process can then be simulated resulting in a set of overhead rates which are adjusted for government exceptions (51:Attachment 1). Thus, the model itself becomes a summary of the government's negotiation position.

...the model is designed to be a "number cruncher" thus allowing [overhead monitoring] personnel to be more effective by concentrating on the contractor's technical and management decisions which cause indirect dollars to be spent [39:1].

Strengths and Weaknesses of the Overhead Monitoring System

There are a number of characteristics of the

procedures as described above which make the current system strong in its efforts to control indirect costs. However, this system also contains a number of weaknesses which limit the effectiveness of its attempts to establish the best possible control. These strengths and weaknesses are summarized in Figure 5. The purpose of this section is to describe these strengths and weaknesses inasmuch as they relate to the positive control of overhead costs. First, the strengths will be discussed.

Strengths

Much apprehension has been expressed by government procurement personnel over the ability of the contractor to change his methodologies of accounting for direct and indirect cost (5:39). The problem associated with this ability is called cost migration. It is simply the condition which allows the contractor to charge as indirect costs certain tasks when it is to his advantage to do so, or, to charge as direct these same tasks when the opposite is true. This flow of costs from overhead to direct, or vice versa, reduces the ability of government personnel to rely on a consistent cost accounting method (5:40). The problem of cost migration has been substantially reduced due to the institution of Cost Accounting Standards (CAS) (60).

Public Law 91-379, 50 U.S.C. App. 2168 as implemented by the Cost Accounting Standards Board...requires the development of Cost Accounting Standards to be used in connection with negotiated national defense contracts and disclosure of cost accounting practices to be used in such contracts [57:Section 3-1201].

Strengths

1. Reduction of cost migration due to institution of Cost Accounting Standards (CAS).
2. Reduction of administrative costs from use of Forward Pricing Rate Agreements.
3. Establishment of Business Management Branches in AFPROs has yielded greater government familiarity with the contractor's overhead control system and access to contractor managers.
4. The local Contract Administration Office is becoming the focal point for all overhead matters.
5. Maximum use is made of the industrial engineering approach for the control of overhead costs.
6. Compliance with C/SCSC requires a review of overhead accounting procedures.

Weaknesses

1. Reliance on after-the-fact negotiation of final overhead costs.
2. Large administrative costs to contractor and government due to lag of final overhead settlement.
3. There is no concrete incentive for the contractor to control indirect costs.
4. Too much emphasis is placed on the overhead rate as opposed to the amount of overhead expended.
5. Current procedures require constant policing by government personnel.

Figure 5 - Summary of Strengths and Weaknesses of the Government Overhead Monitoring System

Once a contractor's accounting procedures are disclosed, they cannot be changed without prior approval of the Administrative Contracting Officer (ACO) (57:Section 3-1205). Arbitrary inconsistent costing by contractors is, therefore, prohibited.

The use of Forward Pricing Rate Agreements (FPRA) for overhead serves two fundamental purposes. This agreement which is negotiated between the ACO and the contractor includes overhead rates which may be used for the pricing of contracts which are negotiated over a specified period of time. An overhead FPRA eliminates the necessity for negotiating overhead costs for every new procurement during the time period covered by the FPRA and, therefore, may save considerable administrative costs for both the government and the contractor (57:Section 3-807.12). The second purpose of an FPRA is that once established, it may serve as a standard of performance for the contractor's expenditure of overhead costs in relation to a specified volume of business.

With the placement of overhead specialists in contractor plants and the establishment of Business Management Branches in the AFPROs, the government has trained personnel monitoring the decisions of contractor management to assure that overhead expenditures are made in the best interest of the government (12:1). The focus on personnel who are "on location" offers the advantage of having specialists who are

thoroughly familiar with contractor procedures and who have greater access to a contractor's managers who make overhead decisions (52:1).

Another strength of the current procedure for controlling overhead is closely aligned to that just mentioned. Specifically, there appears to be a tendency to eliminate situations in government operations which cause a division of responsibility for overhead matters. In accordance with the Air Force's Master Overhead Plan, the local Contract Administration Office (CAO) is becoming the focal point for all overhead matters pertaining to a given contractor, including the final settlement of overhead rates (13; 52:1). This situation offers the advantage of giving the local government personnel, who are responsible for monitoring overhead costs, the leverage with which they can enforce their decisions pertaining to the avoidance of overhead cost expenditures.

The methods used by the Business Management Branches in the AFPROs is also a source of strength in the present system. Maximum use is made of the industrial engineering approach to the control of costs (23:55). By following this approach, the government reviewer is capable of determining if the function is even required as well as if there may be more efficient ways to accomplish it (23:56). The methodology is simple and logical. Additionally, if it

can be applied on a prospective basis to the incurrence of future costs, the industrial engineering approach can contribute substantially to the government cost avoidance efforts.

An attempt to establish a contractor program manager's responsibility for overhead costs is included in the Cost/Schedule Control Systems Criteria (C/SCSC) (53). Criteria checklist items II.9, III.5, and IV.2 call for a thorough review of the overhead accounting procedures to assure that an adequate and consistent system exists for the control and application of overhead costs to the given program (53:Attachment 5). Compliance with C/SCSC is a requirement for "Selected contracts within programs designated as major defense systems [53:2-1]."

Interpreting these documented strengths into the terms of the standard criteria for control systems, it becomes obvious that within the contractor's organization, there is the capability to provide good control over indirect costs. The institution of C/SCSC and CAS has contributed significantly in this respect. In addition, the use of the industrial engineering and "Should Cost" approaches by both contractors and the government, combined with the establishment of AFPRO Business Management Branches, have increased the capabilities of the contractor and government to identify alternate methods of accomplishing overhead functions. Therefore, the current overhead monitoring

process can be scored high in its diagnosing capabilities and in its ability to ensure that resources are related to contractor organizational objectives.

Weaknesses

Probably the biggest weakness of the current procedures for controlling overhead lies in their reliance on after-the-fact negotiating of final overhead costs (62:9). Once costs are incurred, little can be done to prevent their application to defense contracts short of a mechanical determination against allowability or allocability. Specifically, the reasonableness of indirect costs cannot be objectively determined satisfactorily on an after-the-fact basis (62:9).

The after-the-fact approach to settlement of contractors' overhead costs does not provide an adequate method for insuring that such expenditures are kept within reasonable levels [54:22].

As described in Chapter 1, the reason for this inadequacy lies partially in the fact that if a given cost is even incurred, it is obvious that at least the contractor believed the expenditure to be reasonable and prudent (62:6). Under these circumstances, the negotiating basis upon which the government position is built is relatively weak.

A second major disadvantage of the present means of dealing with overhead costs is the tendency for final settlement of overhead to lag extensively beyond the completion of a contractor's fiscal year (5:25).

This is due to the time required by the contractor to close his books and draw off final cost data, the time required for the government to audit and analyze this cost data, and the time required to negotiate and reach agreement relative to the overhead costs, bases, and rates that are used for final contract price adjustments [5:25].

The effects of this situation are that financial and administrative burdens are created for both the contractor and the government as physically completed contracts must be held open and final payment under the contract must be delayed until a final settlement is reached (5:26). Also, considerable opportunity cost is incurred by the government when final settlement is extended because there is a time value of the unliquidated obligation that remains on a contract due to the delays in the contract closure process (20:50-53).

Another weakness of the system as currently designed, is that the incentive feature on Cost-Plus-Incentive-Fee and Fixed-Price-Incentive contracts provides little real incentive to control overhead costs (5:1). The reason is that the incentive feature is part of a contract pertaining to a defense program for which a contractor often appoints a program manager. The program manager, then, is responsible for costs pertaining to the contract. However, overhead is ideally managed on a facility wide basis (53:A5-6). The result is that program managers, who control direct costs and are influenced by an incentive feature of a contract,

are not the people who have adequate control over indirect costs and who are only "indirectly" influenced by the incentive (5:24). While factors like the desire to remain competitive, corporate image, etc. may provide some inducement to control overhead, little direct incentive can be attributed to them.

A potential problem lies in too much concentration on overhead rates as opposed to the amount of overhead expended in order to assess the reasonableness of indirect costs (34:5). Although recent techniques used by overhead specialists such as PIECOST and MODE attempt to deemphasize the rate itself, the use of the FPRA as a standard of performance without recognition of the two elements which form the rate (pool dollars and base) is still found, principally because only the rate is published in the FPRA. The comparison of rates among contractors is ineffective since a function which is charged indirect by one contractor may be charged direct by another (38:31).

A final shortcoming of the current procedures lies in the fact that they require constant policing by government personnel on contractor management of overhead. It is this constant involvement which the National Security Industrial Association has spurned "because the current management surveillance techniques and planning usurp and/or inevitably interfere with management authority [14:26]." It is DOD's

desire not to take over the contractors management functions but rather to ensure that the contractor does the job he is supposed to do (23:3). Therefore, it appears that the perceptions of the defense contractor's and the stated government policy on overhead management do not entirely coincide.

Relating these weaknesses and the previously described monitoring system to the control system standard criteria, it appears that considerable problems exist in the areas of goal congruence, communication of objectives and motivation of action toward accomplishing the objectives. As described earlier, the government's goals with respect to overhead costs are often at odds with those of the contractor. For example, contractors want to maintain their technical capabilities in a declining business environment. This action results in higher overhead costs. The government, on the other hand, normally wants to purchase at the lowest reasonable price.

Because of the reliance on after-the-fact negotiation of overhead costs, the government is failing to communicate its desires to the contractor in sufficient time to impact the contractor's decisions. A necessary follow-on is the failure of the government to adequately motivate the contractor to meet the government objectives. Because of these shortcomings, the government is not capitalizing on its

potential influence as to what overhead costs should be incurred.

Summary

In this chapter, the means by which a contractor manages his overhead expenditures was discussed. In addition, the procedures which the government personnel follow in their attempts to monitor contractor indirect costs were also presented along with some of the strengths and weaknesses of these procedures. It is these systems and procedures which will be used as the basis of comparison for the advance incentivized overhead agreement.

Chapter 3

STRUCTURE OF THE ADVANCE INCENTIVIZED OVERHEAD AGREEMENT

As mentioned in Chapter 1, the idea of using an advance agreement between the government and defense contractors covering overhead costs is not new. A number of unsuccessful attempts have been made toward establishing advance agreements in one form or another. Each attempt included a further refinement of the the approach which was previously unsuccessful (16). This study was designed to examine yet another step in the evolution of overhead advance agreement theory. In this chapter, the construction of an incentivized advance agreement for overhead is developed. The first section briefly describes a baseline model from which the research was conducted. It is followed by a discussion of the findings pertaining to alternate features which could be included in the agreement. Finally, the best of these features are combined in a model which is evaluated in Chapter 4 for its advantages and disadvantages.

Curry's Methodology

The model developed by Captain William Curry was utilized as a baseline from which research on this project

extended. Curry's model included an innovative approach toward using advance agreements for overhead. It included a number of characteristics, some of which were applicable to previous models.

Main Characteristics

The first characteristic of Curry's approach was the idea of using binding, prospective, target overhead rates. The advance agreement itself was to include a formula or other method which could be used to determine exactly what the target overhead expenditures should be (14:28). The binding nature of the advance agreement (as opposed to a cancellable feature such as that included in an FPRA) is an extremely critical factor. The ability of either party to cancel the agreement when its effect becomes disadvantageous to that party is clearly inappropriate.

Secondly, as in previous attempts to negotiate advance agreements, this procedure included a provision for target overhead rate adjustment due to variation in the volume of activity associated with the overhead pool. This feature is also necessary because pool expenditures are dependent on the volume of activity and this volume cannot be predicted perfectly (14:27). In essence, this is a provision for a flexible budget of sorts for target overhead expenditures. This capability for rate adjustment due to volume variance will, henceforth, be referred to as the

"flexible target."

A third ingredient of Curry's model, and the key to this step in the evolution of advance agreements, is a sharing arrangement for overruns and underruns (14:28). Whereas previous advance agreement proposals included a 0/100 share ratio, or virtually a FFP contract for overhead, Curry recommends the use of a share ratio such as 80/20 which allows the mutual sharing of risk for overhead expenditures. Once actual overhead expenditures for the overhead pool are verified, this provision requires that the difference between actuals and the target costs, as determined by the "flexible target," are shared between the government and the contractor. An illustration of this concept is provided below.

A final characteristic of this methodology is the establishment of a fund available to the ACO to pay off the contractor's share of any underrun and accept from the contractor his share of any overrun (14:29). This feature precludes the necessity of adjusting every cost reimbursable and FPI type contract to account for the cost sharing feature. The fund is to be created through obligations made by the appropriate government buying agencies doing business with the particular contractor. It should be noted that the legality of such an arrangement has not been investigated.

An Illustration

The characteristics described above can best be seen

in the use of an example. The following illustration was taken with minor changes from an article entitled "Decreased Costs and Increased Profits through Incentivized Overhead" written by Colonel Dorsey J. Talley and Captain William S. Curry (14).

The initial step in the administration of this agreement is the establishment of the flexible target relationships prior to the start of the contractor's fiscal year. Curry envisioned this step, although much more technically complicated, to be a mere extension of the annual FPRA negotiation process. For the purpose of this illustration only one product center, call it an engineering overhead pool, will be addressed. Under current procedures, the overhead rate published in an FPRA is negotiated based upon an anticipated volume of activity (base) and level of expenditures (overhead dollars or pool). Assume in this instance that the government and contractor agree to a projected engineering overhead rate of \$10 per engineering direct labor hour (DLH) based upon an anticipated one million engineering direct labor hours and \$10 million of engineering overhead. The \$10 million figure could logically serve as the target pool expenditure for a base of one million DLHs. However, in order to provide for the possibility of variation in the base, it is necessary to establish a relationship between the base and pool over a range of business activity, not just for a single point.

For the sake of simplicity, this illustration will use a relationship based on three points - a projected, an upper, and a lower level of activity. In other circumstances, more points may be included depending on the relevant ranges of fixed and semi-variable costs. A summary of projected expenditures at the three base levels is provided below.

	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Pool Dollars	\$9,000,000	\$10,000,000	\$11,000,000
Base (DLHs)	\$800,000	\$1,000,000	\$1,200,000

The upper and lower base levels will vary from case to case, but it has been found that the actual level of activity rarely deviates by more than twenty percent from the projected level (44:3). Thus, the government and the contractor have agreed to a flexible target with the projected rate of \$10/engineering DLH to be used in the FPRA for pricing engineering overhead for the upcoming year.

Once the relationships are agreed upon, it is necessary to determine sharing arrangements between the Government and the contractor. In this example a straight sharing arrangement of 80/20 will be used. The Government would pay 80% of all costs over the target and gain 80% of all [savings] below the target. The contractor, on the other hand, would reimburse the Government 20% of costs over the target or be reimbursed 20% of [savings] under the target [14:28].

The final step is accomplished at the end of the

contractor's fiscal year. It involves the determination of the actual base and pool information and the calculation of the target overhead expenditure.

In most cases there will be a volume (base) variance and a spending (pool) variance. To explain the adjustment for a volume variance, the example continues. Suppose that the volume was below the projection. In such a case, it will be necessary to determine the overhead expenses agreed to for the level of business activity which occurred. The example will continue with the actual base for [Engineering Overhead] at 950,000 hours: 50,000 hours below the target. To arrive at the agreed to pool expenditure, it is necessary to obtain the agreed to rate per hour below the projected base. This rate is computed by dividing the projected pool dollars minus the lower level pool dollars by the projected base hours minus the lower level base hours: $[(\$10,000,000 - \$9,000,000) \div (1,000,000 \text{ hours} - 800,000 \text{ hours}) \text{ or } \$5/\text{hour}]$. The next step is to multiply the variance by the rate. Since the projected pool is 1,000,000 hours and the actual pool is 950,000 hours, the variance is 50,000 hours. Multiplying this variance by the rate of $[\$5/\text{hour}]$ results in $[\$250,000]$ which must be subtracted from the projected pool of $[\$10,000,000]$ to obtain the agreed to pool of $[\$9,750,000]$ at 950,000 hours [14:28].

Now suppose actual engineering overhead expenditures for the year amounted to \$9,250,000. Comparing the target with the actuals results in the determination that the contractor underran his target by \$500,000 ($\$9,750,000 - \$9,250,000$). Subsequent application of the share ratio to this figure yields a savings to the government of 80% of \$500,000 or \$400,000 and an increase in profit to the contractor of \$100,000 ($20\% \times \$500,000$). The government's share would be realized through a lower engineering overhead rate used on individual contracts and the contractor's

share is settled by a check issued by the ACO from the fund established for this purpose (14:29). An overrun situation would yield opposite results. The effect of the increased engineering rate on government contracts would be mitigated by the payment to the government of an amount covering the contractor's share of the overrun. Subsequent deobligation of the funds would occur and the buying agencies would receive their proportionate share of the ACO's fund after an amount is either paid to or received from the contractor. In either case, the effect on the government is claimed to result in essentially the same thing: a decreased expenditure on overhead than would have occurred had the agreement not been in effect (14:29-30).

Of course, this illustration is simplified by the assumption that all effort at this contractor's facility is government related and is only on cost reimbursable or FPI type contracts. It is obvious that this assumption is unrealistic, but it was made to simplify the discussion. In a real application, the proportion of overhead pertaining to commercial and FFP efforts would be excluded from the agreement (13).

Primary Innovations

By reviewing the example offered above, the new aspects of Curry's approach become evident. First, he introduces the use of a sharing arrangement other than 0/100.

The effect of this feature is that the government is bearing a share of the risk associated with the incurrence of overhead cost with the contractor. One can make a case for the position that the government already does share the risk associated with overhead costs through the incentive feature of the individual contracts. However, a weakness of the current overhead monitoring system identified in Chapter 2 is that the effect of such contractual incentives on overhead control may be questionable. This feature also answers the objection contractors had to the 0/100 sharing arrangement which was characteristic of previous attempts to reach advance agreements on overhead. This objection was that the 0/100 share ratio forced an unfair proportion of risk onto the contractor. The approach is, in effect, a compromise between current procedures and the FFP nature of previous attempts to arrive at an advance agreement.

The second major innovation of Curry's methodology is the establishment of a fund under the control of the ACO to settle the incentive feature of the agreement. Previous approaches relied on predetermined variable target overhead rates which would automatically be used for contract closeout (5:2; 82). In the majority of cases, therefore, the contract closeout rates would be different from those rates which were actually experienced by the contractor. Curry's

method of using a separate fund results in the settlement of the incentive using a method separate from the determination of final overhead rates. The rates used to close out contracts would be those negotiated between the contractor and the government in a manner similar to current procedures (13). The incentive feature would be settled via a monetary transaction.

The objective of Captain Curry's methodology is to gain more congruent government and contractor goals pertaining to indirect costs. "If the [approach] is successful, as it should be, the contractor and the government (thus the taxpayers) will benefit by higher profits and lower costs [respectively][14:29]."

Identified Alterations and Alternatives

The methodology which Curry developed formed the basis for discussion in follow-on research. Subsequent contacts and interviews disclosed a number of ways of altering this basic model and also presented a few alternative means of administering the advance incentivized overhead agreement. In this section, these alterations and alternatives will be analyzed. Based on the research and interviews, the best features will be identified for inclusion in the model which is presented in the next section.

Contractual Arrangement

Three basic alternative arrangements were identified for possible use in implementing an incentive on overhead. First, a separate incentive contract could be used to cover all overhead costs. Second, a plant-wide agreement covering indirect costs could be used, however, unlike the first alternative, overhead would still be charged to defense program associated contracts. Finally, a special incentive arrangement could be included as a clause in a program related contract. These alternatives are discussed and examined below.

The use of a separate contract for contractor overhead costs is a revolutionary approach toward controlling overhead costs. The approach would certainly provide the structure for facility-wide visibility and control of overhead costs, which is, after all, the proper perspective with which to view the management of overhead (37). It would also give to the Contract Administration Office a task the CAO would be totally responsible for, and one for which the impact of good or poor performance could be directly felt. Implementation of such an approach, however, would require major changes in current procurement and pricing procedures. The results of this factor alone could be sufficient to prevent its use. Yet, probably the greatest shortcoming of using a separate contract for overhead is that it may

totally disassociate the overhead functions from the direct efforts overhead is intended to support. This could cause a serious imbalance in the utilization of indirect functions by program managers who may no longer be charged for the services they use.

The advantage of plant-wide management of overhead is also a characteristic of the second alternative for implementing the incentive feature. This approach includes Curry's methodology as well as previous attempts to arrive at an advance agreement for overhead (5; 8; 14; 59). Settlement of the incentive can be accomplished through adjustment in final contract overhead rates or by the use of a monetary payment as proposed by Curry. The primary strength of this method is the ease with which the incentive can be applied to all cost reimbursement and FPI efforts at a contractor's facility without necessitating the inclusion of a provision in each contract involved.

Finally, a clause could be attached to an individual contract incentivizing the proportion of overhead associated with that contract (21; 26; 35). This approach would work in a manner similar to Curry's in that annual overhead targets would have to be negotiated (possibly via FPRA negotiations) over the life of the contract. The approach is different in that the incentive feature is only applied to the proportion of overhead properly allocated to the subject

contract. To continue with the previous example pertaining to engineering overhead, if 50 per cent of the engineering DLHs are expended on one contract, then 50 per cent of the engineering overhead pool would be subjected to the incentive arrangement. Settlement of the award would be accomplished through adjustment of the engineering overhead rate for that contract only (21). Needless to say, in order to provide any sizeable incentive to the contractor, the proportion of business involved would have to be large. This would require the incentive clause to be used on a contract sizeable enough to dominate the contractor's operations or would require the provision to be included in multiple contracts. It would probably be easier for the government to reach an agreement with the contractor if this approach were used, however, it also introduces multiple administrative handling if more than one contract is involved and different terms are included in each (35).

It appears that the best contractual arrangement is to use a binding agreement covering the contractor's entire facility. This approach would allow the maximum application of the incentive over the widest possible base. Individual contracts would not have to include a provision for the incentive, thus keeping administrative handling to a minimum.

Mandatory vs. Voluntary

A question surfaced in the course of the research as

AD-A047 634

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHO--ETC F/G 15/5
AN ANALYTICAL VIEW OF ADVANCE INCENTIVIZED OVERHEAD AGREEMENTS --ETC(U)
SEP 77 P J LYNCH, J M PACE
AFIT-LSSR-14-77B

UNCLASSIFIED

NL

2 OF 2
AD
A047634



END
DATE
FILMED
1- 78
DDC

to whether the agreement should be made mandatory or voluntary. Voluntary participation by defense contractors ensures the proper reception and attitudes on their part and would contribute to the total positive environment in which defense contracting should take place. On the other hand, voluntary participation would also open the door for contractor gaming of the incentive feature from year to year (48). For example, a contractor could conceivably forego a necessary capital investment during a year in which the agreement is in force, and in so doing, reduce indirect expense by reducing depreciation, thus gaining a profit because of the incentive feature on overhead. The following year, the contractor could elect not to enter into an agreement and in that year make the required investment. The result is that overhead costs were not actually decreased (and in fact total costs may have increased due to the late investment) yet the contractor has gained additional profit based on an assumed savings in the first year. The likelihood of this occurring is unknown. In fact, it is possible that it rarely would occur since it is likely that a contractor would make necessary investments to benefit the long term profitability of the firm rather than seek short run profits by delaying an investment (26). However, experience has shown that voluntary use of new procurement techniques has failed to result in widespread adoption of such techniques (36). Therefore, there may be a need to make it mandatory.

Mandatory use of the agreement would prevent gaming from year to year such as described above. However, it would not encourage eager acceptance by contractors. In addition, mandatory use would necessitate occasional unilateral decisions by the ACO in cases where government-contractor negotiations failed to reach agreement on targets prior to the start of the contractor fiscal year. Judging from the history of late FPRA publication, this situation may occur frequently (1:21,46,49). The unilateral decision must then be subject to the Disputes Clause which could result in litigation that would prevent the timely closeout of contracts.

Ideally, it would be desirable to make the use of an agreement mandatory in order to ensure its adoption. However, it is not seen how this could be accomplished in light of contractor dispute ramifications. It appears, then that voluntary use of an agreement would be appropriate in view of its advantages to both contracting parties.

Basis for the Incentive

An extremely important facet of the incentive arrangement is to determine exactly what the basis will be from which the incentive will be calculated. Specifically, it is necessary to identify those cost items which must be excluded from consideration of an incentive award.

The starting point, of course, is the total of all indirect costs of an overhead pool. The first exclusion

would consist of those overhead expenditures associated with commercial efforts or government work being accomplished on FFP contracts (22). It would be clearly inappropriate to reward a contractor for efficiencies associated with these types of efforts. ASPR requires proper distribution of overhead costs to all appropriate cost objectives so identification of these exclusions poses no problem (57:Section 15-203).

Another logical exclusion would be those costs which are uncontrollable at the level in the contractors organization with which the agreement is reached (11:1). An example of these types of costs are the allocation of overhead costs from higher tier organizational levels.

Also excluded from the incentive baseline should be those costs deemed unallowable by ASPR (11:2). These costs can be excluded by mere recognition of a historical level of disallowances or by specific identification of unallowable expenditures. If a cost itself cannot be legally allocated to a government contract, then it certainly follows that the government would not want to reward a contractor for reducing these costs.

Finally, all costs which may be covered by other advance agreements should be excluded from the advance agreement for overhead (12:1; 59:2). The reason for this is that the terms of the other advance agreements already set

the level of reasonableness of cost for the particular items covered. There is no need to duplicate this action. Bid and Proposal and Independent Research and Development costs are typical areas which are already covered by advance agreements.

Additional provisions should be made for alteration of the incentive baseline for accounting changes required by ASPR and CAS promulgations, for excessive inflation, acts of God, war, energy crises, etc., and possibly even for special investment situations (13: 26; 59:3). ASPR and CAS often require changes in a contractor's accounting system, changes which may affect the incentive baseline for the overhead agreement. Since equitable adjustments are required for changes due to promulgations, it follows that an equitable adjustment for the incentive arrangement would also be appropriate. Holding a contractor to a given baseline under circumstances beyond his control such as disasters due to acts of God, etc., would also be unfair. It may also be desirable to allow for adjustment to the incentive target baseline for special investments. A procedure could be designed which requires the contractor to demonstrate an unforeseen opportunity to reduce total costs by making an investment which will be of ultimate benefit to the government. This may reduce any reverse cost motivation as identified earlier. If a procedure of this nature were utilized, extreme care must be exercised to ensure that the contractor

does not take advantage of this capability for baseline alteration.

Separation of the Advance Agreement from the FPRA

Although the FPRA and the advance agreement could be arrived at through one negotiation, and even combined in one document, most advance agreement attempts recognized the need for separating the two instruments for administrative purposes (5:14-15; 8:2; 12). FPRA's are still considered to be cancellable agreements under this approach while the advance agreement must be binding. An attempt to tie the FPRA to the target rate of the advance agreement may work out at the beginning of the fiscal year but as soon as the volume of business or levels of indirect expenditure begin to deviate from the projected figures, the two will probably become incompatible.

If the actual rates are expected to be higher than originally forecasted, using the old rate will result in the overpricing of overhead on defense contracts. In this case, it would be to the government's advantage to cancel the FPRA. If the actual rates are expected to be higher than originally projected, the contractor will want to ensure that the cost targets for new business are current to reflect anticipated year end costs. In either case, the FPRA can be cancelled without affecting the effectiveness of the advance agreement since the advance agreement will allow

for volume variances and relies on the cost variation from target in order to calculate the incentive award.

Government Involvement in the Contractor Budget Cycle

Development of the indirect cost targets can include government interaction in the contractor's budgeting procedures, or can rely on negotiations based on independent evaluations of proper overhead levels of expenditure. The DOD/NASA Overhead Test Plan of the late sixties and the Advance Overhead Agreement Test Plan of the early seventies required the contractor to release his internal budget to the government for analysis prior to negotiating the overhead targets. Base and overhead expenditure projections, together with supporting data, were to be furnished to the ACO (5:15-16; 8:4). This feature maximized government visibility into the contractor's accounting and budgeting procedures but also drew heavy criticism from contractors as they feared government intervention into contractor internal matters and eventual limited flexibility in management actions (5:33).

An alternative to government receipt of contractor budgetary information is the development of an independent government position utilizing MODE methodology. Using this procedure, a "Should Cost" analysis of indirect costs at various levels of activity could be accomplished. It would negate the need for review of what contractors consider

proprietary information for any reason other than to assure that proper accounting procedures were used.

The Air Force and, more specifically, AFCMD has spent a number of years attempting to refine a model and methodology to assist in the negotiation and tracking of overhead costs. The result is MODE which was discussed in Chapter 2. It emphasizes "Should Cost" evaluations of discrete cost elements (9:Chart 21). The use of the MODE capabilities and methodology to derive an independent government position with respect to advance agreement figures is certainly a logical outgrowth of its use in determining FPRA rates. It, therefore, appears appropriate that the approach requiring an independently developed government position for negotiation of the advance agreement be emphasized.

Share Line Construction

Two major issues surround the slope of the share line for the incentive feature of the advance agreement. The first issue deals with the establishment of the contractor's share above and below the target at any base level. One position is that the objective of the incentive is to encourage efficiencies rather than penalize inefficiencies and, therefore, the contractor share for underruns should be greater (e.g. 70/30) than the share for overruns (e.g. 80/20) (14:28). The other position is that in order to prevent contractor gaming from year to year, the same share

ratio should be used both over and below the target (21). The issue is one which must be addressed in each situation and a decision made based either upon the confidence the government has in the contractor or upon tradeoffs at the negotiating table.

The second major issue surrounding the share line is how to determine just what the contractor's share will be. Certainly this matter would be subject to negotiation but the government must be careful not to place too much emphasis on overhead or else the management of total costs may be overshadowed by this incentive. On the other hand, the government must also ensure that the contractor's share is substantial enough to incentivize the contractor to take positive measures to control indirect costs. As a guideline, Curry has suggested using a contractor share which approximates the weighted average of those existing on all of the incentive type contracts at that facility (13). A share line of this nature essentially doubles the incentive on overhead costs. For example, if the weighted average of all incentive contracts at a facility results in a 70/30 share ratio and a 70/30 share ratio is used in the overhead advance agreement, then a reduction in indirect costs of \$1000 would yield \$600 of profit to the contractor (\$300 on the contract and \$300 on the advance agreement) while a decrease in direct costs of \$1000 would only yield a \$300 increase in profit.

Method of Funding

Assuming that a decision was made to implement a plant-wide agreement rather than one applicable to a single contract, a choice must be made regarding the method of settling the incentive feature. Two basic methods were identified in the course of the research. The first method is the one recommended by Curry. It includes the establishment of a separate government fund upon which checks could be drawn in order to pay the contractor's share of an underrun or into which the payment for the contractor's share of an overrun can be deposited (13). In order for each government buying activity to bear an equitable burden of the funding of the plan (and also equitably share in the benefits derived), each such buying agency which enters into a cost reimbursable or FPI type contract with the contractor would be required to contribute to the fund. Using this alternative, the ACO may experience some difficulty obtaining adequate fund obligations from the buying agencies. Also, this method regards the settlement of the incentive as an administrative matter entirely separate from the determination of final overhead rates. Negotiations to determine the final overhead rates would still be required. So, a primary advantage of the use of an advance agreement, that is the predetermination of final overhead rates and, hence, the contribution toward timely closeout of

contracts, may not be fully realized.

The second alternative method of funding the incentive is through adjustment in the final overhead rate (21; 26). This method essentially relies on the audit of contractor actual cost and base figures. Using these figures and the targets established previously and included in the advance agreement, the government and contractor shares of the cost variance can be mechanically calculated. The contractor's share of an overrun or underrun either would be subtracted from or added to the overhead pool. Subsequent calculation of the final overhead rate would be accomplished by dividing the adjusted overhead pool by the audited base figure. While this procedure appears to infer that final overhead rates are audit determined, one must recall that the advance agreement assumes that the question of reasonableness has already been determined by the Contract Administration Office when the agreement was initially negotiated. Therefore, this procedure is not in disagreement with item two of the Master Overhead Plan which calls for Air Force responsibility for overhead management (52:1). The rate adjustment procedure appears to be the least cumbersome of the two finding alternatives and, in the opinion of the authors, is the best of the two methods.

Treatment of Underruns and Overruns in Follow-on Targets

A major consideration in the administration of the

agreement is how to treat the underrun or overrun of the current year when determining the targets for the succeeding year. If an underrun were to occur in the current year due to one-time management actions, it would be inequitable to penalize the contractor in the following year by adjusting the overhead pool target by the full amount of the savings (5:37). On the other hand, it would be extremely difficult to justify to Congress and the taxpayer that once a level of efficiency is established, the government should continue to pay the contractor an amount adequate to cover a lesser level of efficiency (26).

Also, if the government totally penalizes the contractor in an underrun situation by decreasing the pool target in the next year, it logically follows that the government should allow an increase in the pool target for the next year if the contractor overruns the current year's target. If this were to occur, the government may be rewarding inefficiency and penalizing efficient overhead management.

The answer to this dilemma, in the minds of the authors, is to settle the matter in negotiations with the contractor when establishing the next year's target. Again, each year an independent government position should be developed using the MODE methodology. It is important not to limit the contractor to short term gains alone. The

advance incentivized overhead agreement must benefit the contractor in the long run also. Still, the public's interests must be protected. This solution places a great burden on the negotiation process but is seen by the authors as the most practical alternative.

Construction of the Model Advance Incentivized Overhead Agreement

The best medium to illustrate how the advance incentivized overhead agreement should work is the use of an example. The following example was developed in order to help the reader understand the entire approach. A fictitious contractor, ABC Electronics, will be used for this illustration. Two overhead pools will be addressed, a Product Center (Manufacturing Pool) and an administrative center (G&A Pool). Two other pools covering engineering overhead and material purchasing overhead do exist at this contractor's facility but only the manufacturing and G&A pools will be discussed here. The bases for the manufacturing and G&A pools are manufacturing DLHs and Input to Work in Process (IWIP). IWIP, for this purpose, includes all costs at ABC's facility excluding the G&A pool itself.

The Proposal

The initial step in the implementation of the advance incentivized overhead agreement is the submission by ABC of a proposal which includes overhead pool amounts for at least

three different levels of base activity. This submission is to be made to the CAO in sufficient time to allow the analysis and negotiation of prospective overhead rates prior to the beginning of the contractor's fiscal year which will be covered by the agreement. Assume ABC submits the following proposal for variable targets covering contractor fiscal year (CFY) 1978.

Manufacturing Pool

	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Pool Dollars	\$30,000,000	\$32,000,000	\$35,000,000
Base (DLH)	\$800,000	\$1,000,000	\$1,200,000
Rate	\$37.50	\$32.00	\$29.17

G&A Pool

	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Pool Dollars	\$47,000,000	\$51,000,000	\$57,000,000
Base (IWIP in Dollars)	\$160,000,000	\$200,000,000	\$240,000,000
Rate	29.38%	25.50%	23.75%

Also assume the government has developed the following position regarding overhead for CFY 1978. The government position resulted from a review of the proposal and the performance of an independent overhead analysis using the MODE approach.

Manufacturing Pool

	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Pool Dollars	\$27,000,000	\$29,000,000	\$32,000,000
Base (DLH)	800,000	1,000,000	1,200,000
Rate	\$33.75	\$29.00	\$26.67

G&A Pool

	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Pool Dollars	\$45,000,000	\$49,000,000	\$54,000,000
Base (IWIP in Dollars)	\$160,000,000	\$200,000,000	\$240,000,000
Rate	28.13%	24.50%	22.50%

The government position is based on the same base levels contained in the contractor's proposal to allow for negotiations on a common basis. However, the CAO must ensure that these base levels are reasonably accurate.

The Negotiation

The negotiation process is the key to the entire concept of an advance agreement, for here is where the determination of reasonableness is made. It is also likely to be the most difficult step in the entire process, for it is where the binding targets must be agreed to for final

settlement of overhead rates. During negotiations, it is necessary to determine the targets to be used for the settlement of the overhead incentive, the items which are to be excluded from the advance agreement and the sharing arrangement for underruns and overruns. Note that this same process can be used to determine the forward pricing rates for overhead also.

Assume the negotiations between the government and ABC were successfully conducted. The following pool targets were agreed to:

<u>Manufacturing Pool</u>			
	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Pool Dollars	\$28,000,000	\$30,000,000	\$33,000,000
Base (DLH)	\$800,000	\$1,000,000	\$1,200,000
Rate	\$35.00	\$30.00	\$27.50

<u>G&A Pool</u>			
	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Pool Dollars	\$46,000,000	\$50,000,000	\$56,000,000
Base (IWIP in Dollars)	\$160,000,000	\$200,000,000	\$240,000,000
Rate	28.75%	25.00%	23.33%

It has been agreed that these base and pool figures will be utilized to settle the incentive feature of the advance

agreement.

An understanding was also reached as to what items will be excluded from the incentive portion of the agreement. Base and pool amounts pertaining to commercial efforts or work applicable to FFP contracts will not be considered in the incentive calculation. It was also agreed that the IR&D and B&P limit of \$10 million as determined in a Tri-Service advance agreement and all uncontrollable corporate allocations will be deducted from both the target and actual figures before the settlement of the incentive feature is accomplished. It is important that the CAO ensure that corporate allocations are made on an equitable basis.

Finally, the sharing arrangement was agreed to at 70/30 which approximated the weighted average of the share arrangements of all incentive type contracts covered under the agreement. These terms and conditions were executed in a document included as Appendix C to this paper. (The document in Appendix C is provided for illustrative purposes only and has not been approved for actual use).

Forward pricing rates were also determined in negotiations. The projected rates in each of the pools were selected for use for the first year covered in the FPRA. Thus, \$30.00 and 25% were included as the Manufacturing and G&A overhead rates respectively in the FPRA for the CFY 1978 as determined by information available at that time.

Cancellation of the FPRA

Approximately one half of the way through CFY 1978, ABC decided to cancel the FPRA because the rates contained therein no longer represented accurately enough the rates expected to exist for CFY 1979 and 1980. This action is totally permissible under the terms of the advance agreement but only affects the rates used for pricing new efforts. The binding nature of the advance agreement itself is not affected by the FPRA cancellation.

Settlement of the Incentive

The audit. At the close of CFY 1978 an audit is accomplished to determine exactly the pool cost and base figures. Because of the terms of the advance agreement, IR&D, B&P and corporate allocations must be itemized. The results of the audit are as follows.

Manufacturing Pool

Pool dollars (excluding unallowable and unallocable costs)	\$29,400,000
DLH - Commercial	300,000 DLH
- FFP	150,000 DLH
- Cost reimbursement and FPI contracts	<u>450,000 DLH</u>
Total	900,000 DLH

Rate = $\$29,400,000 / 900,000 \text{ DLH} = \32.67

G&A Pool

Pool dollars
(excluding unallowable and
unallocable costs)

- IR&D and B&P	\$10,000,000
- Corporate Allocations	5,000,000
- Local G&A (excluding IR&D and B&P)	<u>31,000,000</u>
Total	\$46,000,000

IWIP

- Commercial	\$69,000,000
- FFP	16,000,000
- Cost reimbursement and FFP contracts	<u>85,000,000</u>
Total	\$170,000,000

$$\text{Rate} = \$46,000,000 / \$170,000,000 = 27.06\%$$

Adjustment for exclusions. The first step that must be accomplished in order to determine what the incentive settlement should be is to properly treat the audited data in order to develop the correct information. First, the base figures will be adjusted. From the audit information, it can be determined that 50% of the bases of both the Manufacturing and G&A pools apply to commercial or FFP efforts. Under the terms of the advance agreement, one half of the pool dollars of each overhead pool will be excluded from further consideration of an incentive award.

Next, the exclusions covering corporate allocations and costs covered by other advance agreements must be

recognized. In this illustration, one advance agreement was in effect with ABC Electronics. IR&D and B&P costs of \$10 million were the items covered. Also, \$5 million of corporate allocations were identified. Both cost categories are applicable to the G&A pool. Under the terms of the advance agreement, these costs should be subtracted from the G&A target and actuals before a calculation of the incentive award can be made.

Target calculations. The target expenditure level for both the Manufacturing and G&A pools are calculated in a number of steps: 1. A rate of volume variance from the projected base must be obtained by dividing the projected pool dollars minus the lower level pool dollars by the projected base minus the lower level base. The lower level was used in this case because the volume was less than originally projected; 2. Multiply the rate found in number one by the variance from the projected base level to arrive at the pool dollar target adjustment; 3. Subtract this amount from (if the actual volume is less than that projected) or add it to (if the actual volume is greater than projected) the projected pool expenditure level to arrive at the preliminary overhead target for the actual volume of activity (base); 4. Adjust for exclusions. These four steps are performed for the ABC Electronics example in Figures 6 and 7.

Step

1 Volume Variance Rate =

$$\frac{\$30,000,000 - \$28,000,000}{1,000,000 \text{ DLHs} - 800,000 \text{ DLHs}} = \$10/\text{DLH}$$

2 Pool Dollar Target Adjustment =

$$\$10/\text{DLH} \times (1,000,000 \text{ DLH} - 900,000 \text{ DLH}) = \$1,000,000$$

3 Preliminary Overhead Target =

$$\$30,000,000 - \$1,000,000 = \$29,000,000$$

4 Adjust for Exclusions:

Preliminary Overhead Target	\$29,000,000
Less exclusions due to commercial and FFP Business @ 50%	<u>\$14,500,000</u>
Manufacturing Pool Target	<u><u>\$14,500,000</u></u>

Figure 6 - Manufacturing Pool Target Calculations
for ABC Electronics

Step

1 Volume Variance Rate =

$$\frac{\$50,000,000 - \$46,000,000}{\$200,000,000 - \$160,000,000} = 10\%$$

2 Pool Dollar Adjustment =

$$10\% \times (\$200,000,000 - \$170,000,000) = \$3,000,000$$

3 Preliminary Overhead Target =

$$\$50,000,000 - \$3,000,000 = \$47,000,000$$

4 Adjust for Exclusions:

Preliminary Overhead Target		\$47,000,000
Less Exclusions:		
-Due to other Advance Agreements	\$10,000,000	
-Due to Corporate Allocations	5,000,000	
-Due to Commercial and FFP business @ 50%	<u>23,500,000</u>	<u>38,500,000</u>
G&A Pool Target		<u>\$8,500,000</u>

Figure 7 - G&A Pool Target Calculations
for ABC Electronics

Actuals calculations. Calculation of actual overhead pool dollars which will be subjected to the incentive determination is accomplished by subtracting the excluded cost items from the audited actuals. These calculations for the ABC company are shown in Figure 8.

Determination of the incentive award. The amount of the overrun or underrun is obtained simply by subtracting the pool actuals from the pool targets after all adjustments are made. For the ABC Electronics example, it can be seen that the contractor overran his manufacturing pool target by \$200,000 (\$14,500,000 - \$14,700,000) while he underran his G&A pool target by \$500,000 (\$8,500,000 - \$8,000,000).

The conditions of the advance agreement state that any overrun or underrun will be split between the government and ABC Electronics based on a 70/30 share ratio. Applying this share ratio to each of the pools involved yields the following results. First, the contractor is required to absorb 30% of the manufacturing pool overrun of \$200,000 or \$60,000. Second, the contractor should be awarded 30% of the G&A pool underrun of \$500,000 or \$150,000.

Since the utilization of the audited overhead rates of \$32.67/DLH for manufacturing and 27.06% for G&A as the final overhead rates would result in essentially a 100/0

Manufacturing Pool

Audited Actuals (CFY 1978)	\$29,400,000
Less exclusions due to commercial and FFP Business @ 50%	<u>14,700,000</u>
Manufacturing Pool Actuals	<u><u>\$14,700,000</u></u>

G&A Pool

Audited Actuals (CFY 1978)	\$46,000,000
Less exclusions:	
-Due to other Advance Agreements (IR&D and B&P)	\$10,000,000
-Due to Corporate Allocations	5,000,000
-Due to Commercial and FFP business @ 50%	<u>23,000,000</u>
	<u>38,000,000</u>
G&A Pool Actuals	<u><u>\$8,000,000</u></u>

Figure 3 - Calculation of Manufacturing
and G&A Actuals Subject to the Incen-
tive Feature for ABC Electronics

share line, the recognition of the contractor's 30% share can be accomplished simply by adjusting these rates. The easiest method of doing this is to adjust the pool dollars by the amount which was determined to be the contractor's share of the overrun or underrun and then recalculating the rates. These calculations would be performed as follows:

Manufacturing Pool

Audited Pool Dollars (CFY 1978)	\$29,400,000
Adjustment for Incentive (30% of overrun)	<u>60,000</u>
Adjusted Pool Dollars	\$29,340,000
Audited Base in DLH	900,000
Final Overhead Rate (CFY 1978)	\$32.60

G&A Pool

Audited Pool Dollars (CFY 1978)	\$46,000,000
Adjustment for Incentive (30% of underrun)	<u>150,000</u>
Adjusted Pool Dollars	\$46,150,000
Audited Base (IWIP)	\$170,000,000
Final Overhead Rate (CFY 1978)	27.15%

Because the advance agreement stipulated that the resultant would be used as final overhead rates, the manufacturing rate of \$32.60/DLH and the G&A rate of 27.15% would be used for CFY 1978 to close out all cost reimbursable and FPI type contracts with ABC Electronics. The need for extended final overhead rate negotiations is eliminated.

Summary

In this chapter, the construction of the advance incentivized overhead agreement was addressed. The basic model upon which this research was based was presented. The innovative characteristics of that model were highlighted. Next, a number of issues were discussed which provided alternatives as to how the agreement should be structured. Finally, a detailed illustration of how the agreement would be administered was presented. In the next chapter, information will be presented which will identify the strengths and weaknesses of such an approach toward controlling overhead.

Chapter 4

STRENGTHS AND WEAKNESS OF THE ADVANCE INCENTIVIZED OVERHEAD AGREEMENT

Introduction

The government's current procedures for monitoring indirect costs have a number of strengths and weaknesses as identified in Chapter 2. Similarly, the advance agreement model developed in the last chapter also has advantages and disadvantages which must be considered before a recommendation can be made regarding its use. The purpose of this chapter is to discuss these strengths and weaknesses which are characteristic of this model. Those items identified will then be related to the desired control system characteristics discussed in Chapter 1.

Strengths of the Advance Incentivized Overhead Agreement

In 1969, the DOD/NASA Overhead Study Group identified advantages of using the advance agreement method of controlling overhead. Since the model developed in Chapter 3 is a further refinement of the approach studied by that group, many of those advantages are applicable to the latest model. In addition, the alterations discussed in this paper have

constituted further refinements resulting in additional strengths of using advance agreements for overhead. These strengths are discussed below.

Combined Negotiations

The first advantage of employing an advance agreement as described in Chapter 3 is that only one negotiation per year need take place for the determination of FPRA and Final Overhead rates (5:23; 8:6). Under current procedures, both sets of rates result from entirely separate negotiation processes. Multiple negotiations may be possible when using the advance agreement but only if the option to cancel or renegotiate the FPRA is exercised. If that option were exercised, chances are the FPRA would be cancelled whether an advance agreement was in effect or not, thereby introducing an additional negotiation cycle. Thus, the use of an advance agreement of this nature combines the first and last overhead negotiation pertaining to any given contractor fiscal year. The effect is reduced administrative costs associated with the negotiation process.

Plant-wide Emphasis on Overhead

The second strength of monitoring overhead using the advance agreement is that it tracks overhead cost on a plant-wide basis rather than on a contract basis (5:24; 37). Currently an incentive fee may be paid to the contractor for

good overhead management on a contract basis. However, this procedure may be somewhat ineffective.

Fixed price and other incentive type contracts provide a contractual environment which motivates the contractors to properly manage and control overhead costs to some degree, whereas other contractual arrangements such as cost type contracts reduce this motivation considerably. Accordingly, the contractor's contractual incentive to control costs tends to be project or contract oriented, rather than on a plant-wide or overhead function basis [5:24].

The reason the contractual orientation may be ineffective is that the contractor budgets and controls overhead on a departmental or functional basis (59:679). Therefore, the contractual basis for incentivizing overhead is incongruent with the plant-wide management system used by the contractor. The advance incentivized overhead agreement emphasizes plant-wide control and does not confine the incentive to a particular contract.

Determining Reasonableness Before-the-Fact

The advance agreement has the strength of being able to determine the reasonableness of costs before the costs are incurred (5:24-25; 43). Under current procedures, final overhead rates are negotiated based upon actual costs incurred. On the question of reasonableness, if the contractor's actuals differ from the government's position, the burden of proof of unreasonableness lies with the government (5:25). The procedure described in Chapter 3 includes the negotiation of a method of determining what a reasonable

level of expenditure is before the start of the contractor fiscal year. This results in a range of reasonable cost targets the exact level of which is determined by the volume of activity actually experienced by the contractor. An important factor is that this procedure lends itself to the control of actual costs rather than the mere payment of actuals and, thus, contributes toward the Air Force's goal of cost avoidance.

Timeliness of Final Settlement

Timely settlement of final contract overhead is another strength attributed to the use of advance agreements of this type (5:25-26; 8; 35; 42). The timely settlement is possible because the requirement for final overhead negotiations is eliminated. In its place is a negotiation conducted at the beginning of the contractor fiscal year to arrive at a formula for final settlement. At the end of the fiscal year, actual bases and costs are audited and, through a simple adjustment, final overhead rates are produced which can be readily used to close out physically completed contracts. Lack of timely settlement of overhead has often been identified as a major problem in the government's overhead monitoring process (1:47; 5:25; 20). It is a shortcoming which results in greater administrative costs for both the contractor and the government and forces the government to bear considerable opportunity cost because

of unliquidated obligations remaining on individual contracts (20:50-53). The shortening of the time required for close out of contracts is, then, an area in which the advance agreement can make a significant contribution.

Derivation of an Independent Government Position

A criticism which contractors offered toward previous attempts to incorporate advance agreements for overhead is that each plan required government involvement in the contractor's budgeting process (5:33-34; 8:4). While knowledge and familiarity with the contractor's budgeting procedures is necessary in any case, the model developed in Chapter 3 should lessen contractor objections. This model employs a "Should Cost" or MODE methodology in order to derive an independent government position regarding the negotiation of reasonable targets for the advance agreement and rates to be used in the FPRA. Although interaction with contractor personnel is required where MODE is used, involvement in the budgeting process itself is eliminated. A great deal of time and effort has been devoted to the development of the MODE overhead models. The discrete analysis approach included therein would lend itself directly for employment in this role.

Realistic Targets Likely

A final strength of the advance incentivized overhead

agreement over previous advance agreement attempts is that using a share line other than 0/100 is more likely to result in reasonable overhead targets (14:26). The fixed price nature of the DOD/NASA and AFCMD approaches forces the contractor to bear all the risk associated with the incurrence of overhead cost, and, as in virtually all FFP arrangements, the contractor is going to charge the government for bearing that risk so contingencies can be covered (42). The result is that contractors are unwilling to agree to overhead targets "...unless the targets [are] set sufficiently high to assure the receipt of an additional profit and to avoid the possibility of a loss [14:26].

With the introduction of a share ratio in which the government bears a proportion of the risk, the contractor allowance for contingencies should be reduced and easier agreement on reasonable targets should be made possible.

Weaknesses of the Approach

In addition to the expected advantages discussed above, there are some disadvantages which may result from the implementation of the advance incentivized overhead agreement. The following are the major weaknesses identified by the research.

Gaming Possibilities

Whenever incentives are employed in the contracting

environment, the possibility exists for the gaming of the incentive by the contractor (26; 48). This can be accomplished in a number of ways. First, because of the voluntary nature of the agreement, it is possible for the contractor to alternate years under the plan. During the years in which the advance agreement is in effect, the contractor could conceivably forego investments and, in a sense, live off of accumulated supplies and usage materials. Then in those years in which the agreement is not applicable, he could stockpile for the next year. Hence, he could gain additional profits from the incentive feature of the agreement because of the appearance of an overhead savings. Of course, a game that is this obvious would easily be detected and surely not openly attempted by the contractor, but it could occur in selective cases where the impact of such a practice may be great. Similar gaming possibilities will exist when the contractor share for underruns exceeds that for overruns. This situation essentially allows a less extreme version of the alternating one year on, one year off, game. The solution to gaming situations such as these is to concentrate on the MODE "Should Cost" approach to overhead cost analysis. Too much reliance on historical cost data will cultivate a gaming environment.

Effect on Multiple Incentive Contracts

The incentive on overhead may cause an imbalance in

the total incentive program on multiple incentive contracts (6). The DOD exerts a great deal of effort attempting to achieve a balance of incentives on cost, schedule, and performance.

If an overhead agreement which will result in an extra and very strong incentive to reduce overhead costs is then superimposed on the multiple incentive agreement, the balance will be upset and the contractor will have a compelling reason to cut costs at the expense of performance and/or delivery beyond the point of optimum cost effectiveness [6:2].

Possibility of Windfall Profits

Considerable concern was expressed in early attempts to incorporate advance agreements for overhead around the possibility for the contractor to gain windfall profits (5:38). There are three possible sources for what can be called windfall profits when using the advance agreement. First, excess profits could be obtained through the use of gaming techniques as mentioned above (44:5). Costs of particular concern are those which are discretionary in nature and which may be postponed to a later period. Thus, the reduced overhead costs and the associated rise in contractor profits is the result of the delay of costs rather than the positive managerial efforts to reduce or control costs. The second source of windfall profits is the negotiation of high overhead targets, a technique which also may be regarded as a gaming tactic (18:6; 44:5). When a contractor intentionally negotiates a high cost target with the government, he has little difficulty underrunning that

target and, thus, increasing his profits, not because of good cost management, but because of overstated targets. Again, this factor places a great deal of emphasis on the quality of the negotiators and the effectiveness of the negotiations. Finally, a point can be made that the double incentive on overhead resulting from application of the agreement on top of any contractual incentive will result in an inordinate increase in profit. It can be said that cost control is a basic management task and that to doubly incentivize management to do what it should normally do is inappropriate.

Reverse Cost Motivation

There is a possibility that the advance agreement may cause reverse cost motivation (5:37,39; 22). For example, assume during a year in which an advance agreement was in effect the contractor is faced with the possibility of making a capital investment to switch from a manual process to an automated one. Such an investment would increase his overhead expense due to the additional depreciation on the new equipment. If the incentive is such that this increase reduces the expected total profit below what it would have been had he continued with the manual process, the investment would probably not be made. Thus, even if the total system's cost to the government is reduced, unless the contractor can substantiate the need for the new

equipment under some special investment provision of the agreement, he is being incentivized to keep the old, more costly process. Without some means of dealing with these situations, the government could be defeating itself.

"The goal of procurement policies should be to minimize the total cost of [defense] systems, not to minimize some portion of total cost [25:1]."

Short Range Contractor Benefits

Regardless of the mitigating effect the negotiation process is likely to have, the advance incentivized overhead agreement is still likely to yield only short term benefits for the contractor (5:37). Actual costs always carry a great deal of influence in follow-on negotiations, and good management that results in an underrun in the first year cannot help but become evidence against contractor's interests in the next year. The government will not be able to justify to Congress or the public continual payment of extra profits because of a target set at a level higher than historical actuals. The goal in the treatment of previous overruns, as well as underruns, is to separate the effects of good cost management and spending efficiencies from those pertaining to actual volume or technological changes (48). Underruns due to volume or technology changes should impact follow-on targets whereas those resulting from positive management actions should not. Categorizing these causes,

however, may present a difficult challenge.

Reduced Contractor Flexibility

A contractor criticism of the DOD/NASA proposed plan and one which may also be applicable to the current model is that the advance agreement reduces the managerial flexibility the contractor has regarding decisions affecting the operations of the company (5:34-35). The structure of the agreement is such that it, for all practical purposes, dictates management actions. The ultimate effect is that this inflexibility may in turn fragment the total cost concept mentioned earlier and cause an increase in the total cost performance of the company. To what degree the advance agreement dictates management decisions is questionable, but it is true that the plan is designed to influence management actions in overhead control.

Administrative Difficulties

The agreement as developed in Chapter 3 contains a number of provisions which may prove to present some administrative difficulties (21; 33; 44; 48). The plan could be too utopian in its reliance on the establishment of realistic targets. The DOD has always had a difficult time estimating costs in uncertain environments and, while there is little or no technical uncertainty surrounding overhead costs themselves, the fact that overhead covers so many

functions carries with it a great deal of complexity. Establishing a good target for such a complex cost element will surely be extremely difficult.

Associated with this point is the recognition of the difficulty of conducting discrete analyses on so many various overhead cost functions. The MODE methodology which is the procedure used to derive the independent government position relies on these discrete analyses.

Although decisions pertaining to major investments will generally be made well in advance of negotiations to allow their consideration in the establishment of overhead targets, the prevention of reverse cost motivation is of sufficient importance to establish some means of adjusting the overhead targets for special investment situations (26). What constitutes a special investment and in what situations they should warrant target adjustment is a difficult question to answer. Administration of such a provision to ensure proper application also presents a challenge.

Finally, as mentioned previously, there are bound to be some administrative difficulties surrounding the adjustment of follow-on targets for previous year overruns or underruns. Identification of the causes of overruns and underruns would be required. Reliance on an already complicated negotiation process in itself may not yield equitable results for the government or the contractor.

Strengths

1. Combined FPRA and final overhead negotiations;
2. Emphasizes plant-wide control of overhead;
3. Determines the reasonableness of indirect costs before they are incurred;
4. Contributes toward timely, final, contract settlement;
5. Allows the derivation of an independent government negotiation position;
6. Easier agreement on realistic overhead cost targets.

Weaknesses

1. Opens the door for contractor gaming of the incentive;
2. May upset the balance on multiple incentive contracts;
3. Could possibly lead to windfall contractor profits;
4. May lead to reverse cost motivation;
5. Likely to yield short range contractor profits;
6. Reduces contractor managerial flexibility;
7. Introduces a number of administrative difficulties.

Figure 9 - Summary of the Strengths and Weaknesses of Using an Advance Incentivized Overhead Agreement

Local procedures and policies to handle these administrative difficulties would have to be developed. A summary of these strengths and weaknesses is included in Figure 9.

Relationship to Control System Characteristics

In Chapter 1, six qualities were identified as characteristics of good control systems. Relating the model, its advantages and disadvantages to these characteristics, a determination can be made regarding the overall impact of using an advance incentivized overhead agreement. Implementation of an advance agreement should not detract from the capabilities of the contractor to internally control overhead costs. This capability was identified as a strength of the current monitoring process and should continue to be one. In addition, with an incentive on overhead costs and the increased emphasis on contractor industrial engineering and government "Should Cost" analyses, the ability of the overhead control system to identify alternative means of accomplishing overhead functions should be improved.

The utilization of the advance agreement should also improve on the current government monitoring system specifically in the areas of goal congruence and communication of government objectives to the contractor. With the assumption that profit is at least a minor motivating force for

defense contractors, it can be deduced that the advance incentivized agreement makes the goals of the contractor and the government congruent. This is true because, if the agreement is successful, contractor profits will increase and government expenditures on overhead will be reduced and subject to greater control. By implementing an incentive exclusively on indirect costs over and above any contractual incentive, the government is also emphasizing the importance which it puts on the control of this cost element. Hence, the government is better able to communicate its goal of overhead control to the contractor.

An advance agreement by its very nature recognizes the discretionary nature of overhead costs since it is the incurrence of discretionary costs as well as normal indirect costs that the government wants to influence. It encourages, through the use of the profit motive, the careful analysis of the need for discretionary indirect functions.

Probably its greatest weakness with regard to control system characteristics is its strict reliance on profit to motivate contractor actions. Whether or not profit is an effective motivator is a matter which has often been debated. If profit is not a motivating force for defense contractors then the advance incentivized overhead agreement would be ineffective in its attempts to control indirect costs.

From a theoretical standpoint, then, it appears that the use of an advance agreement can improve on the performance of the currently used overhead monitoring system. Specific benefits are gained in the establishment of goal congruency between the government and the contractor. It also helps in the communication of government goals regarding the incurrence of indirect costs and offers the government a vehicle with which to indirectly influence contractor overhead decisions.

Summary

As with any alternative, the advance incentivized overhead agreement has both its strengths and weaknesses. The two sides must be carefully weighed before a determination can be made as to whether or not its use would be appropriate. The agreement offers the elimination of a negotiating cycle, provides for timely contract closeout and contributes to government cost avoidance efforts. The weaknesses of the approach concern some practical and administrative difficulties.

The strengths and weaknesses of the advance agreement technique need to be considered in light of two basic goals: lower total costs of defense systems acquisition and the payment of a fair and reasonable price to defense contractors. If a technique can lower and contribute toward the

control of total costs and ensure a fair and reasonable price to the contractor, then it is worthy of consideration for use.

Chapter 5

CONCLUSIONS

This chapter will summarize the findings of the research project and draw the conclusions which have been gleaned from the effort. Corollary findings and recommendations for further study will also be identified.

Findings

Research Question Number 1: What are the strengths and weaknesses of existing government overhead monitoring systems?

Defense contractors have sufficient capabilities to provide good control over indirect costs. The institution of C/SCSC and Cost Accounting Standards has contributed significantly in this respect. In addition, the use of the industrial engineering and "Should Cost" approaches by both contractors and the government, combined with the establishment of AFFRO Business Management Branches, have increased the capabilities of the contractor and government to identify alternate methods of accomplishing overhead functions. Therefore, the current overhead monitoring process can be scored high in its diagnosing capabilities and in its ability to ensure that resources are related to contractor organizational objectives.

However, considerable problems with the current

systems exist in three areas: goal congruence, the communication of government objectives to contractors, and the motivation of contractor actions toward accomplishing government objectives. First, the government's goals with respect to overhead costs are often at odds with those of the contractor. For example, contractors generally want to maintain their technical capabilities in a declining business environment. This action results in higher overhead costs. The government, on the other hand, normally wants to purchase at the lowest reasonable price which may mean releasing the capabilities. Second, because of the reliance on after-the-fact negotiation of overhead costs, the government is failing to communicate its desire for lower costs to the contractor in sufficient time to impact the contractor's decisions. A necessary follow-on is the third problem which is the failure of the government to adequately motivate the contractor to meet the government objectives. Because of these shortcomings, the government is not capitalizing on its potential influence as to what overhead costs should be incurred. Specific strengths and weaknesses of the government overhead monitoring system are outlined in Figure 5 on page 60.

Research Question Number 2: How can an advance incentivized overhead agreement be structured to stimulate the profit motive?

The development of an advance incentivized overhead

agreement is covered in detail in Chapter 3. The agreement appears to be best structured through the combination of the following characteristics:

1. Use of a plant-wide agreement;
2. Voluntary participation;
3. Exclusion of selected cost items such as IR&D, uncontrollable costs and costs associated with FFP and commercial efforts;
4. Separation of the advance agreement from the FPRA;
5. Development of an independent government negotiating position using MODE;
6. Negotiated sharing arrangement on underruns and overruns;
7. Funding through the adjustment of overhead rates; and,
8. Negotiated treatment of underruns and overruns in follow-on years.

Inclusion of these features in advance agreement utilization should assist in stimulating the contractor profit motive.

Research Question Number 3: What are the strengths and weaknesses of an advance incentivized overhead agreement?

Identified as strengths of the current monitoring process were the capabilities of the contractor to internally control overhead costs and the ability of contractor and the government to identify alternative means of accomplishing overhead functions. Implementation of the advance incentivized overhead agreement should enhance these capabilities. The utilization of the advance agreement should

also improve the current government monitoring system in the areas of goal congruence and communication of government objectives to the contractor. Goal congruency is established since, if the agreement is successful, contractor profits will increase and government expenditures for overhead will be reduced and subject to greater control. By implementing an agreement exclusively on indirect costs over and above any contractual incentive, the government is also emphasizing the importance which it puts on the control of this cost element.

An advance agreement by its very nature recognizes the discretionary nature of overhead costs since it is the incurrence of discretionary costs as well as the normal indirect costs that the government wants to influence. It encourages, through the use of the profit motive, the careful analysis of the need for discretionary indirect functions.

The greatest weakness of the advance incentivized overhead agreement is its strict reliance on profit to motivate contractor actions. Whether or not profit is an effective motivator is a matter which has often been debated. If profit is not a strong motivating force, the effectiveness of the advance agreement will be seriously impaired. Specific strengths and weaknesses of the advance incentivized overhead agreement are summarized in Figure 9 on page 118.

Research Question Number 4: Do the advantages of an advance incentivized overhead agreement as weighed against its disadvantages and those of current methodologies sufficiently improve the control of overhead expenditures to warrant its adoption by DOD?

One major objective for contract managers in the DOD is to lower the total cost of procuring defense systems. A parallel objective is the establishment of better control over acquisition expenditures. Since overhead costs constitute a substantial portion of the DOD dollars spent in the procurement of defense systems, their control has become an area of special concern. The advance incentivized overhead agreement is a tool which should help to establish this control. The model agreement presented in Chapter 3 has many advantages and disadvantages associated with it. These factors had to be carefully weighed especially with regard to their relationship to the ideal control system characteristics identified in Chapter 1.

Earlier attempts at establishing advance overhead agreements had failed for several reasons. The plan attempted by the DOD/NASA Overhead Study Group in the late 1960's was unsuccessful due to the opposition of both government and contractor representatives (5). The two groups opposed the plan for fear of injury to their parochial interests. Modifications to the plan were not adequately pursued. The AFCMD Advance Overhead Negotiation Test Plan of the early 1970's met a similar fate although

it included several improvements (43). A program related advance agreement covering the overhead associated with the Advance Combat Fighter was developed but subsequently discarded by government procurement managers as being too utopian (26). Captain William Curry introduced an incentive feature to the plant-wide advance agreement for overhead, an incentive feature over and above any which may be part of defense program contracts. The incentive feature represents, in the opinions of the authors, the further evolution and refinement in the advance agreement concept.

In a theoretical sense, the arrangement is quite logical. "The general approach is sound and should have a positive effect on contractor management of overhead cost [37:1]." Despite the earlier failures of advance overhead agreements, the authors believe that the approach merits another attempt at success. There are several reasons why the additional effort is warranted, each of which counters previous objections for using advance agreements.

First, with the implementation of Cost Accounting Standards, the possibility of indirect to direct cost migration is eliminated. ASPR Section 3-1200 requires contractors to file an accounting disclosure statement which describes his accounting procedures. These procedures cannot be changed without prospective notification of the ACO. CAS removes a major objection to previous advance

agreement plans.

Second, the inclusion of a share ratio other than 0/100 in the advance agreement relieves the contractor of the large burden of risk inherent in previous plans. Although the government bore some of the risk via the contractual share ratios, the risk associated with the advance agreement itself was to be completely assumed by the contractor in previous agreements. The risk sharing feature of the advance incentivized overhead agreement is a key development which should remove a primary objection voiced by contractors to other plans.

Third, the agreement presented in Appendix C and illustrated in Chapter 3 includes a provision for revising or cancelling the advance agreement when the government and the contractor mutually agree that a major event beyond the control of the contractor (such as floods, energy crises, etc.) has occurred. In the minds of the authors, a provision of this type is necessary to gain acceptance by contractors. Certainly, specific guidelines for items affected by this provision would have to be developed. This fact alone may present quite a controversy. However, the authors contend that it is inequitable to hold the contractor responsible for items truly beyond his control or beyond his capabilities for taking corrective or mitigating actions.

Fourth, contractor fears of short run benefits only

should be lessened by government attempts to separate cost reductions due to technological or volume changes from those resulting from positive management actions. Contractors must recognize that it is to the government's advantage to reward management efficiencies to ensure long run benefits to both parties. Thus, using this plan, the annual overhead cost targets will be based upon objective evaluations of what overhead costs should be using the MODE methodology rather than on an arbitrary decrease in the target cost figure due to an underrun of the previous year's target.

Fifth, the utilization of the MODE approach toward developing a government negotiating position should eliminate the involvement of the government in the contractor's budgeting cycle. Interaction with contractor personnel will be required in the course of accomplishing the discrete evaluations of the MODE methodology but the contractor will still have the capability of conducting his budgeting process independent of government actions.

These developments and features of the advance incentivized overhead agreement make it significantly different from past attempts at establishing an advance agreement. They overcome a number of the objections raised against former attempts at such an agreement. The weaknesses of this approach lie primarily in situations which may occur

as a result of inadequate performance of duties by the overhead monitoring team. If an advance incentivized overhead agreement were made operational, a big responsibility would be placed on the contract administration office to ensure that gaming, reverse cost motivation and windfall profits would not occur. In addition, a great deal of effort would be required to overcome the administrative difficulties of certain provisions in the agreement. The task would not be an easy one for the CAO, however, the authors believe that the agreement does offer great potential for increased overhead control.

The greatest improvements offered by the agreement are in the establishment of congruency between government and contractor goals and in the communication of the government goals to the contractor. The impact of these findings indicate that the advance incentivized overhead agreement should be further pursued.

Corollary Findings

In the course of the research for this study, a number of observations were made which could not be totally substantiated but which may have an impact on the eventual implementation of the advance agreement or upon the control of overhead costs in general. These findings are as follows:

First, it appears that a primary obstacle to the implementation of the advance incentivized overhead agreement is psychological in nature. There is a tendency among AFCMD overhead managers to believe that an agreement such as that constructed in Chapter 3 would constitute a fallback to the era of audit determination of final overhead settlement because of the reliance on the mechanical nature of calculating the adjusted final overhead rates. In addition, as with many new techniques, there is considerable apprehensiveness about changing the current "safe" way of doing business. This inertia can stymie a more effective means of establishing overhead control.

Second, a position which is often held is that profit is not the strongest motive for defense contractors. Other goals emphasizing firm perpetuation, sales maximization, technical and socio-economic considerations may be equally strong or stronger in some cases (31:40). Experience has shown that defense contractors respond more positively to incentives on technical achievement rather than on schedule or cost performance (50). This may lead one to believe that the desire to be a technical leader is stronger than the profit motive. It has been shown, however, that an organization's goals are a reflection of the goals of the individuals who make up the organization (15:26). Since defense programs are managed by technically oriented

contractor personnel, it follows that the technical goals of a program would be emphasized over profit.

Contractor overhead costs are different in that they are managed on a plant-wide basis by personnel who are generally part of the contractor's controller organization. Hence, they are more likely to be business or profit oriented. The authors believe that this factor makes a substantial difference regarding the strength of the profit motive and, hence, the effectiveness of the incentive feature of the agreement.

Third, overhead costs may not be able to be affected in the next year. They are the result of the contractor's policies and budgeting system which involve decisions made sometimes many years in advance. The decisions which will impact the incurrence of overhead cost in the year subject to the advance agreement may have been made long before the agreement is reached and, hence, may leave little flexibility for the contractor to improve short run performance.

Fourth, the use of the advance agreement will ideally lower total plant overhead costs. While the agreement does not directly apply to FFP contracts, the increased efficiencies of lower overhead costs may lessen the indirect costs applicable to future FFP contracts. Therefore, the long range government benefits are not confined to cost reimbursable and FPI contracts.

Fifth, any attempt to implement the advance incentivized overhead agreement will require the full support and commitment of top level DOD procurement managers. This support was absent in previous efforts and contributed to their failure (5:38).

Recommendations for Further Study

This study has evaluated the fundamental theory surrounding the use of the advance incentivized overhead agreement. It should be followed by additional research in three areas. First, the model agreement developed in this study should be presented to defense contractors for comment. Emphasis should be placed on the differences between this and previous advance agreement plans to determine if the changes are sufficient to overcome the objections to prior attempts. Contractors may also offer suggestions for further refinement of the agreement. When presenting the agreement to the contractors, it must be with the idea of deriving a workable agreement which is beneficial to both government and contractor interests. Therefore, discussions and comments should not be limited to the agreement as constructed in this study alone.

The second area of required study involves the legal ramifications of the advance incentivized overhead agreement. An in depth review of procurement laws and regulations must be conducted to see if there are any prohibitions pertaining

to the use of such an agreement. Also, an examination of legal decisions made by the Comptroller General, the Armed Services Board of Contract Appeals or the Federal courts must be made to see if and how any such decisions will impact the use of an advance agreement. Finally, a review of ASPR must be made to identify any changes required to permit the advance agreement implementation.

Third, if the previously recommended research areas prove to reinforce the findings of this study, a test case should be conducted to determine the effectiveness of the agreement in a realistic environment. This exercise would surface the practical benefits or shortcomings of using such an agreement as well as confirm, one way or the other, the validity of the theory upon which it is based.

Summary

The control of contractor overhead costs has presented a real challenge to DOD procurement managers.

Improved overhead cost management techniques can identify operating efficiencies and produce viable cost savings which will help meet this challenge and produce the new systems which are required for the Air Force operational inventory of the future [1:54].

The advance incentivized overhead agreement is one technique which should increase the efficiencies of indirect cost control. It provides a unique opportunity to lower the total cost of weapon systems and to establish greater

control over indirect costs through the stimulation of the profit motive.

From a theoretical standpoint, the approach is sound and should yield greater control. It formalizes the cost avoidance procedures of the overhead monitoring team, procedures which are a distinct portion of the Air Force's Master Overhead Plan. Practical problems lie in the administrative changes necessary to implement the agreement and in psychological barriers preventing wholehearted acceptance of the approach.

Additional research needs to be accomplished in order to validate the conclusions of this study. If the findings of the follow-on research indicate that the features of the advance incentivized overhead agreement do overcome the weaknesses of its predecessors from the contractor's viewpoint and that there are no substantive legal barriers to its use, the authors believe the agreement should be implemented. The authors contend that its use will yield greater control of defense contractor overhead costs.

APPENDIX A
ACRONYM LIST

ACO	Administrative Contracting Officer
AFCMD	Air Force Contract Management Division
AFPRO	Air Force Plant Representative Office
AFSC	Air Force Systems Command
ASPR	Armed Services Procurement Regulations
B&P	Bid and Proposal
CAO	Contract Administration Office
CAS	Cost Accounting Standards
CFY	Contractor Fiscal Year
CPAF	Cost Plus Award Fee
CPFF	Cost Plus Fixed Fee
CPIF	Cost Plus Incentive Fee
C/SCSC	Cost/Schedule Control Systems Criteria
DCAA	Defense Contract Audit Agency
DCAS	Defense Contract Administration Service
DLH	Direct Labor Hour
DOD	Department of Defense
FFP	Firm Fixed Price
FPI	Fixed Price Incentive
FPRA	Forward Pricing Rate Agreement
G&A	General and Administrative
IR&D	Independent Research and Development
IWIP	Input to Work in Process
MODE	Monitoring Overhead through Discrete Evaluations
PIECCST	Probability of Incurring Estimated Cost

APPENDIX B
OBJECT MODES AND THEIR DRIVERS

<u>Object Mode</u>	<u>Independent Variables</u>
Indirect Labor	Indirect headcount Indirect labor hours
Employee Benefits	Total headcount or hours Total deflated gross payroll
Payroll Taxes	Total headcount or hours Total deflated gross payroll
Employment	New hires
Communications/Travel	Officials and managers headcount Total headcount or hours
Production Related	Direct headcount or hours Work-in-process Machine hours
Buildings and Land	Square footage Net book value of assets
Furniture and Equipment	Square footage Net book value of assets
Administration	Administrative headcount or hours Deflated sales or cost of sales Total headcount or hours
Future Business	Deflated sales or cost of sales Engineering headcount or hours
Miscellaneous	Deflated sales or cost of sales Services headcount or hours Total headcount or hours
Credits	Average inventory

APPENDIX C
ADVANCE OVERHEAD AGREEMENT

ADVANCE OVERHEAD AGREEMENT

ABC ELECTRONICS CORPORATION

INCENTIVIZED ADVANCE OVERHEAD AGREEMENT
FOR THE CONTRACTOR FISCAL YEAR 1978

THIS AGREEMENT is between the United States of America, hereinafter called the Government, and ABC Electronics Corporation, a corporation organized and existing under the Laws of the State of _____, hereinafter called the Contractor; and

WHEREAS the Government and the Contractor desire to enter into an Incentivized Advance Overhead Agreement for the Contractor's fiscal year 1978, in lieu of settlement of overhead costs under the provisions of ASPR 3-704.1 and 7-203.4; and

WHEREAS the Contractor has proposed for each of his major overhead pools the pool dollars associated with three (upper limit, projected, lower limit) levels of the appropriate bases by letter _____, dated _____, a copy of which is on file in the office of the official executing this Agreement on behalf of the Government, and

WHEREAS the Government and the Contractor, using the cost principles set forth in ASPR XV, have agreed on a relationship between overhead pool dollars over a variable range of associated bases as set forth in the attached

Exhibit A for the Contractor's fiscal year above mentioned, such relationship to be used by the Contractor and the Government with respect to the settlement of incentives for the Contractor's management of his pool dollars over a range of variable bases.

NOW THEREFORE, the Government and the Contractor agree as follows:

1. Notwithstanding the provisions of the contracts covered by this agreement or any Forward Pricing Rate Agreement (FPRA) for overhead costs, the clause attached hereto and the relationship of pool costs to the appropriate bases for each major overhead pool with the associated sharing ratios for overruns and underruns of indirect pool costs will apply to the settlement of the overhead incentive and to final settlement of overhead costs for individual cost reimbursement and fixed price incentive contracts for the Contractor's fiscal year 1978. Indirect costs (specifically IR&D/B&P) included in other advance agreements will not be subject to this agreement, but will be determined in accordance with the terms of the individual agreements involved. Uncontrollable corporate allocations will not be subject to this agreement but will be evaluated by the Corporate Administrative Contracting Officer.

2. For reimbursement of indirect costs and establishment of final prices under contracts covered by this

agreement, overhead rates for costs incurred during the Contractor's fiscal year 1975 will be settled in the manner as follows:

Deviations from the negotiated pool expenditures (overruns and underruns) shall be shared between the Government and the Contractor on a ratio of 70/30. The Government's share shall be 70% and the Contractor's share shall be 30%. Such deviations to be settled as follows:

OVERRUNS: A net overrun for each major overhead pool shall be settled by the subtraction from the Contractor's overhead pool of an amount of money equal to thirty percent of any such overrun.

UNDERRUNS: A net underrun for each major overhead pool shall be settled by the addition to the Contractor's overhead pool an amount of money equal to thirty percent of any such underrun.

Overhead rates will then be recalculated after the adjustment made above. Rates so determined for payment or settlement will immediately be distributed by the Principal ACO to all interested Government activities. The rates will be used to determine final indirect costs for fiscal year 1978 on all contracts covered by this agreement.

3. The accounting for the cost of Contractor Indirect functions will not be changed during the Contractor's fiscal year 1978 without the written consent of the Principal Administrative Contracting Officer (ACO) or his designated

representative, except as provided below for CASB/ASPR compliance. Changes in accounting for the cost of these functions would include such matters as revising the classifications of a cost from indirect to direct within a particular major overhead pool. Any accounting changes made necessary because of ruling of the Cost Accounting Standards Board (CASB), or because of changes in ASPR will be automatically incorporated in consonance with the effective date of such changes and the predetermined relationship between pool expenditure and associated bases will be accordingly revised for such changes. A proposal to change accounting treatment of costs may be initiated by either party, but may not be effected without approval of the ACO.

4. In accordance with 3 above, the Contractor maintains and shall continue to maintain accounting coding and personnel classification systems as evidenced by Cost Accounting Board Disclosure Statement dated _____, as revised _____, Standard Procedures _____ and _____ dated _____, and the official charge of Accounts which clearly identified direct and indirect labor and nonlabor cost categories.

5. At the conclusion of the Contractor's fiscal year 1978, the Government Auditor will verify the actual base experienced by the Contractor for each major overhead pool.

A statement of such actual base and the actual overhead costs incurred shall be submitted by the Contractor to the Principal ACO within 120 days after the close of the Contractor's fiscal year 1978. Using the actual base and the actual pool expenditures, after subtracting negotiated disallowances based on unallowed and unreasonable costs from the pool expenditures, the Government will select the overrun or underrun for each major pool by interpolation, assuming a straight line relationship between the projected and lower limit, and between the projected and upper limit. The projected meaning the most likely level of activity for the applicable base, and the lower limit and upper limit meaning some base activity less than or more than the projected, respectively. The difference between the actual costs and the agreed to relationship will be used to determine the final settlement of the incentive using the share ratio of 70/30 and after adjustment for settlement of the incentive resultant rates will be used for final settlement of indirect costs for Contractor's fiscal year 1978 on all contracts to which this agreement applies.

6. Annually, not later than 45 days prior to the beginning of the Contractor's fiscal year, the Contractor will submit to the Principal ACO a variable budget proposal (with projected, upper limit and lower limit) for the next Contractor's fiscal year for each major overhead pool. At the

earliest practical date after submission of such annual proposal, negotiations will be conducted by the Principal ACO and Contractor to reach agreement on the (i) relationship between base and pool costs for each major overhead pool and (ii) identification of the Contractor functions which are to be treated as direct and indirect costs in accordance with paragraphs 3 and 4 above. At the conclusion of each Contractor's fiscal year, the final overhead rates and incentive settlement will be determined in accordance with paragraphs 2 and 5 above.

7. If, for any Contractor's fiscal year, the Principal ACO and the Contractor fail to agree to a prospective relationship between bases and major overhead pools, or if actual bases are determined to be under or over the minimum/maximum levels of volume previously negotiated by the Principal ACO and Contractor and incorporated into this agreement, the allowable indirect cost shall be determined in accordance with the appropriate contract clause in effect on the date of the contract or contracts involved without provision for an incentive payment.

8. Under special situations where the Contractor and Government desire a deviation from the cost reimbursement or incentive aspect of this agreement for a particular contract, such as a special provision related to overhead, then a prior concurrence shall be obtained from the Principal ACO before such a contract is executed.

9. Overhead rates used for forward pricing will be those established in advance for the projected bases and set forth in the Attached Exhibit B for fiscal years 1978, 1979 and 1980.

10. This agreement, insofar as the forward pricing aspect is concerned, may be renegotiated or cancelled at the request of either party. In the event a renegotiation of forward pricing rates is requested, such renegotiation shall be completed and the results incorporated into this agreement within 90 days after the date of such request. In the event a cancellation is requested, such request shall be made in writing at least 90 days prior to the date on which it shall become effective. Neither the renegotiation nor cancellation of the forward pricing aspects of this agreement shall have retroactive effect beyond their dates of effectivity. The renegotiation or cancellation action may encompass all or any combination of fiscal years covered by this agreement. This agreement, insofar as the cost reimbursement aspect is concerned, is not subject to cancellation and will be firm for the entire Contractor's fiscal year 1978 except in extremely rare situations when targets incorporated into this agreement may be subject to renegotiation because of disasters caused by acts of God, Energy Crises, periods of unexpected excessive inflation or special investment situations and, then, only

if both the Government and the Contractor agree to such renegotiation.

11. IN WITNESS WHEREOF, the Contractor and the Government cause this Agreement to be signed on their respective behalfs by their duly authorized representatives.

ABC ELECTRONICS CORPORATION

DATE _____

BY _____

UNITED STATES OF AMERICA

DATE _____

BY _____

OVERHEAD TARGET RELATIONSHIPS

	<u>Lower Limit</u>	<u>Projected</u>	<u>Upper Limit</u>
Engineering Pool:			
Pool Dollars	\$59,000,000	\$62,000,000	\$67,000,000
Base (DLH)	1,600,000	2,000,000	2,400,000
Manufacturing Pool:			
Pool Dollars	\$28,000,000	\$30,000,000	\$33,000,000
Base (DLH)	800,000	1,000,000	1,200,000
G&A Pool:			
Pool Dollars	\$46,000,000	\$50,000,000	\$56,000,000
Base (IWIP)	\$160,000,000	\$200,000,000	\$240,000,000
Material Purchasing Pool:			
Pool Dollars	\$2,450,000	\$2,500,000	\$2,550,000
Base (Material Dollars)	\$48,000,000	\$50,000,000	\$53,000,000

EXHIBIT A

FORWARD PRICING RATES

	<u>1978</u>	<u>1979</u>	<u>1980</u>
Engineering (per DLH)	\$31.00	\$35.00	\$39.25
Manufacturing (per DLH)	\$30.00	\$31.00	\$33.00
G&A	25.00%	24.50%	23.20%
Material Purchasing	5.00%	5.05%	4.90%

EXHIBIT B

SELECTED BIBLIOGRAPHY

A. REFERENCES CITED

1. "AFSC Overhead Cost Management - A Performance Analysis." Unpublished AFSC Inspector General Report, PN 74-33, 7 July 1975.
2. Anthony, Robert N. Management Accounting: Text and Cases. Homewood, Illinois: Richard D. Irwin Inc., 1970.
3. _____, John Dearden and Richard F. Vancil. Management Control Systems. Homewood, Illinois: Richard D. Irwin Inc., 1972.
4. _____, and Regina Herzlinger. Management Control in Nonprofit Organizations. Homewood, Illinois: Richard D. Irwin Inc., 1975.
5. Asch, Milton, and others. "Advance Overhead Negotiation Test Plan." Unpublished final report conducted under the DOD/NASA Overhead Study Group, May, 1969.
6. Babione, Dale R. Assistant Deputy for Procurement Management, Office of the Assistant Secretary of the Air Force. Letter, subject: Proposed Plan for Negotiating Advance Agreements for Payment of Overhead Costs, to DOD/NASA Overhead Study Group, 7 June 1965.
7. Belden, David L. and Ernest G. Cammack. National Security Management: Procurement. Washington: Industrial College of the Armed Forces, 1973.
8. Contractor Overhead Division, Headquarters AFCMD. "Air Force Contract Management Division Advance Overhead Negotiation Test Plan." Undated informal working paper. Kirtland AFB, New Mexico.
9. Contractor Overhead Division, Headquarters AFCMD. "CMD Refinements to PIECOST." Undated briefing charts. Kirtland AFB, New Mexico.
10. Contractor Overhead Division, Headquarters AFCMD. "Monitoring Overhead Through Discrete Evaluations, M-O-D-E - Baseline Model Printout." Kirtland AFB, New Mexico, 27 April 1977.

11. Curry, Captain William S., USAF. "Changes to Incentivized Advance Overhead Agreement Resulting from Discussions with the Contractor." Unpublished working paper. Anaheim, California, 14 May 1975.
12. _____. "Incentivized Advance Overhead Agreement." Undated informal paper outlining approach to control overhead. Anaheim, California.
13. _____, Chief Business Management Branch, Detachment 16, AFCMD. Numerous telephone interviews from November 1976 to June 1977.
14. _____, and Colonel Dorsey J. Talley, USAF. "Decreased Costs and Increased Profits Through Incentivized Overhead." National Contract Management Journal, (Winter 1976-77), pp. 25-32.
15. Cyert, Richard M. and James G. March. A Behavioral Theory of the Firm. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963.
16. Dunn, C. W. Deputy Director of Pricing and Finance, DCS/Procurement and Production, Headquarters AFSC. Letter, subject: Advance Overhead Agreement - Test Plan, to Headquarters USAF/SPP, 7 December 1971.
17. Ebert, Walter V. "Negotiation of Contractor's Overhead Costs." Unpublished research report, unnumbered, Air Command and Staff College, Maxwell AFB, Alabama. November, 1970.
18. Fisher, I. N. "Improving the Effectiveness of Incentive Contracting." Unpublished paper, Santa Monica, California, July 1968.
19. Fox, J. Ronald. Arming America, How the U.S. Buys Weapons. Boston: Harvard University Press, 1974.
20. Galante, Captain Frederick N., USAF, Captain Ronald J. Peterson, USAF, and 1st Lieutenant Rick J. Williams, USAF. "An Analysis of the Relationship of Overage Time Spans in the Contract-Closure Process and Opportunity Cost." Unpublished Masters Thesis, SLSR 3-75B, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson Air Force Base, Ohio, August, 1975.
21. Goers, Colonel Myron B., USAF. Director of Procurement and Production, Headquarters ASD. Letter, subject: Incentive Awards for Overhead Control, to Systems Program Offices, 9 January 1974.

22. Goss, Major William K., USAF. Chief, Business Management Branch, Air Force Plant Representative Office, Hughes Aircraft Company. Letter, concerning use of Advance Overhead Agreement, to 1st Lieutenant John M. Pace, 2 May 1977.
23. "Guide for Monitoring Contractors' Indirect Cost." Unpublished report, AMCP 715-11, Assistant Secretary of Defense (I&L), Washington D.C., July, 1974.
24. Gullo, Carmen F. and Lyle N. Whited. "Evaluating Indirect Costs Through the PIECOST (Probability of Incurring Estimated COST) Approach." Defense Management Journal, (July, 1973), pp. 25-30.
25. Hall, George R. ed. "Comments on a Proposal to Employ Fixed Price Contracts for Indirect Costs." The Rand Corporation, Santa Monica, California, 18 January 1965.
26. Harris, W. A. Deputy Director of Pricing, Aeronautical Systems Division (AFSC). Personal interview, 27 April 1977.
27. Hicks, Herbert G. The Management of Organizations: A Systems and Human Resources Approach. 2d ed. New York: McGraw-Hill Book Company, 1972.
28. Horngren, Charles T. Accounting for Management Control. 2d ed. Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1970.
29. _____. Cost Accounting, A Managerial Emphasis. Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1972.
30. "Industry Warned by USAF Chief of Tighter Surveillance on Costs." Aviation Week, (24 September 1973), pp. 17-18.
31. Jones, Major Julius E., USAF, and Major Russell Pierre, Jr., USAF. "An Analysis of the Effectiveness and Utilization of Incentive Contracts With Respect to Their Intended Purpose." Masters Thesis, SLSR 16-69, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio, August, 1969.
32. Kowalski, Richard J. Chief, Contractor Overhead Division, Directorate of Contract Administration, HQ AFCMD. Letter, subject: AFCMD's Approach to Overhead Cost Modeling, to AFIT/LSGM, 3 May 1977.

33. _____. Telephone interview, 6 April 1977.
34. Wagner, Fredric M. and Richard J. Wall. "Death of PIECOST." Unpublished paper, May, 1975.
35. Marker, Herbert. Chief, Operations Division, Directorate of Pricing, Aeronautical Systems Division (AFSC). Personal Interview, 27 April 1977.
36. Martin, Lieutenant Colonel Martin D., USAF. Associate Professor of Logistics Management, Functional Management Department, Graduate Education Division, School of Systems and Logistics, Air Force Institute of Technology. Personal interview. 21 July 1977.
37. Martinson, Otto B. Logistics Management Institute. Letter, subject: Comments/Suggestions Regarding Overhead Cost Incentive Clause for ACF Contract, to Major General R. F. Trimble, 6 September 1974.
38. _____. "Standard Classification System for the Indirect Costs of Defense Contractors in the Aircraft Industry." Dissertation. Washington D.C.: Government Printing Office, 1969.
39. Mewha, Colonel John, USAF. Commander, Air Force Contract Management Division. Letter, subject: Refined PIECOST Computer Models, to Detachment Commander, Kirtland AFB, New Mexico, 20 August 1974.
40. Newman, J. L. "Make Overhead Cuts That Last." Harvard Business Review, (May, 1975), pp. 116-126.
41. Noe, Lieutenant Colonel Charles G., USAF, Major Larry L. Smith, USAF, and Captain Grady L. Jacobs, USAF. "Defense Cost and Price Analysis." Volume 2. Extension Course Institute, Air University, Gunter Air Force Station, Alabama, February, 1974.
42. Phillips, General Samuel C., USAF. "USAF Poses Industry Challenge." Aviation Week, (14 July 1975), p. 9.
43. Rodriguez, Joseph. Overhead Specialist, Air Force Plant Representative Office, United Technology Center. Telephone interview, 11 May 1977.

44. Slinkard, Lieutenant Colonel John D., USAF. Director, Contract Administration, Headquarters AFCMD. Letter, subject: Decreased Costs and Increased Profits Through Incentivized Overhead, Article Prepared by Captain Curry, to AFSC/PPF, 6 July 1976.
45. Smith, Lieutenant Colonel Larry L., USAF. "The Use of Index Numbers in Defense Contract Pricing." Technical report, AU-AFIT-SL-1-76, AD#AO34421, School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio, November, 1976.
46. _____. Assistant Professor of Logistics Management, Functional Management Department, Graduate Education Division, School of Systems and Logistics, Air Force Institute of Technology, Lecture. 11 November 1976.
47. Sollenberger, J. R. Project ACE Team Leader, HQ AFCMD. Letter, subject: Project ACE, Finding 26, Advance Agreements on Overhead, to AFSC/PPFO, 22 July 1974.
48. Solomon, Colonel Howard, USAF. Director of Procurement, F-16 System Program Office. Personal interview, 20 April 1977.
49. Spiller, Earl A., Jr. Financial Accounting. Homewood, Illinois: Richard D. Irwin Inc., 1971.
50. Strayer, Lieutenant Colonel Daniel, USAF. Chief, Business Management Research Center, Wright-Patterson AFB, Ohio. Lecture. 27 June 1977.
51. Talley, Lieutenant Colonel Dorsey J., USAF. Deputy Commander, Detachment 16, AFCMD. Letter, subject: Refined PIECOST Computer Models, to HQ AFCMD, 17 December 1974.
52. U.S. Department of the Air Force. "Contractor Overhead Costs." Policy letter, 22 January 1973.
53. _____. "Cost/Schedule Control Systems Criteria Joint Implementation Guide." Air Force Systems Command Pamphlet 173-5. Washington D.C.: Government Printing Office, 1972.
54. _____. "Project ACE (Acquisition Cost Evaluation), Findings and Action Plans," Finding 26, Overhead Management, Air Force Systems Command, 5 October 1973.

55. _____ . "PIECOST (Probability of Incurring Estimated Cost)." Air Force Pamphlet 70-14. Washington D.C.: Government Printing Office, 1974.
56. U.S. Department of Defense. "Acquisition of Major Defense Systems." DOD Directive #5000.1. Washington D.C., 18 January 1977.
57. _____ . Armed Services Procurement Regulations. Washington D.C.: Government Printing Office, 1975.
58. _____ . Armed Services Procurement Regulation Manual Number 1. Washington D.C.: Government Printing Office, 1975.
59. "UTC Advance Overhead Agreement." Unpublished working paper, December, 1972.
60. Van Cleve, Harry. General Counsel to the Cost Accounting Standard Board. Address to the Dayton Chapter of the National Contract Management Association, 14 October 1976.
61. Whittaker, Phillip N. "Transition of Acquisition Policy Leads to Development of PIECOST (Probability of Incurring Estimated COST) System." Defense Management Journal, (July, 1972), pp. 25-28.
62. Wynn, Franklin L. "Examination of USAF's Policies for Controlling Contractor Overhead Costs." Unpublished research report, unnumbered, Air Command and Staff College, Maxwell AFB, Alabama, May, 1975.

B. RELATED REFERENCES

- Aaby, Donn V. Chief, Overhead Management Division, Directorate of Contract Management, DCS Procurement and Manufacturing, HQ AFSC. Letter, subject: Request for Review of Appeal (OIS 76-156) Decreased Costs and Increased Profits Through Incentivized Overhead, to AFSC/OIS, 6 August 1976.
- Anthony, Robert N. and James S. Hekimean, Operations Cost Control. Homewood, Illinois: Richard D. Irwin Inc., 1967.

- Barker, Donald Clayton. "Motivating Contractors - Is Incentive Contracting the Only Answer?" Unnumbered study project report, Defense Systems Management School, Fort Belvoir, Virginia. November, 1974.
- Bierman, Harold, Jr. Topics in Cost Accounting and Decision. New York: McGraw-Hill Inc., 1963.
- Buck, Colonel John T., USAF. "Reward Fee Provisions in Defense Contracting." Professional Study no. 5199, Air War College, Air University, Maxwell AFB, Alabama.
- Carroll, Phil. Overhead Cost Control. New York: McGraw-Hill Inc., 1964.
- Carter, George R. Branch Manager, San Francisco Region, Defense Contract Audit Agency. Letter, subject: Forward Pricing Rate Agreement and Advance Overhead Agreement for CY/FY 1975 and Following Years, to AFPRO United Technology Center, Sunnyvale, California, 30 September 1974.
- Clepp, Joe H. Chief Contract Administration Division, Air Force Plant Representative Office, United Technology Center. Letter, subject: Advance Overhead Negotiation, to United Technology Center, 27 August 1974.
- _____. Letter, subject: Forward Pricing Agreement and Advanced Overhead Agreement for CY/FY 1975 and Following Year, to AFCMD/TM, 26 August 1974.
- Curry, Captain William S., USAF, and others. "Report of Contract Completion Analysis (ROCCA)." Unpublished research report. Kirtland AFB, New Mexico, 15 March 1976.
- Dunn, C. W. Deputy Director of Pricing and Finance, DCS Procurement and Production, HQ AFSC. Letter, subject: Advance Overhead Agreement - UTC and Aerojet - General, to AFCMD/TM, 21 January 1972.
- Dunnette, M. D. and R. S. Opsahl. "The Role of Financial Compensation in Industrial Motivation." Readings in Organizational Behavior and Human Performance. eds. L. L. Cummings and W. E. Scott, Jr. Homewood, Illinois: Richard D. Irwin Inc., 1969.
- Fisher, Irving N. "Cost Incentives and Contract Outcomes: An Empirical Analysis." RM-5120-PR. The Rand Corporation, Santa Monica, California, September, 1966.

- Fredlund, Lieutenant Colonel William A., USAF. Air Force Plant Representative Office, United Technology Center. Letter, subject: Advance Overhead Agreement, to AFCMD/TMO, 19 November 1971.
- Frosch, R. A. Assistant Secretary of the Navy for Research and Development, Address at the Sixteenth Annual Institute on Government Contracts, George Washington University/Federal Bar Association, Washington D.C., 8 May 1969, Readings in Acquisition Management for Period of 1969-1972. Compiled by CDR P. DeMays, pp. 325-345. Naval Postgraduate School Print Shop, 1972.
- Goers, Myron B. Deputy Director of Procurement and Production, Aeronautical Systems Division (AFSC). Telephone interview, 25 April 1977.
- Goss, Major William K., USAF. Chief, Business Management Branch, Air Force Plant Representative Office, Hughes Aircraft Corporation. Telephone interview, 15 February 1977.
- Gunn, Major Kenneth C., USAF. "Incentive Contracting: A Synopsis and Guide." Study report, unnumbered, Defense Systems Management School, Fort Belvoir, Virginia, May, 1964.
- Hall, George R. "Comments on a Proposal to Employ Fixed Price Contracts for Indirect Costs." Unpublished report. The Rand Corporation, Santa Monica, California, 18 January 1965.
- Hampton, David R., Charles E. Summer, and Ross A. Webber. Organizational Behavior and the Practice of Management. Illinois: Scott, Foresman and Company, 1968.
- Hill, William Foster and Peter Atwood Shepard. "Effectiveness of Incentive Contracts as Motivators." Unpublished Masters Thesis, Naval Postgraduate School, Monterey, California, September, 1973.
- Johnson, Robert E. The Rand Corporation. Letter, subject: Overhead Study Group Advance Overhead Plan, to HQ USAF, DCS/S&L, 18 January 1965.
- Kast, Fremont E. and James E. Rosenzweig. Organization and Management: A Systems Approach. 2d ed. New York: McGraw-Hill Book Company, 1974.

Kennerman, Carl R. Administrative Contracting Officer, Air Force Plant Representative Office, Martin-Marietta Corporation. Telephone interview, 25 April 1977.

Kerlin, Thomas W. Deputy Chief, Contract Placement Division, Directorate of Procurement Policy, HQ USAF, DCS/S&L. Letter, subject: Advance Overhead Plan, to AFSC/PPF, 19 January 1972.

_____. Letter, subject: Advance Overhead Agreement - Test Plan, to AFSC/PPF, 21 January 1972.

Lynskey, John M. Contracting Officer, Overhead Management Division, Directorate of Contract Management, AFCMD DCS/PPMO. Letter, subject: Request for Review, Case No. AFSC/OIS 76-1942, to AFCMD DCS/PP, 20 December 1976.

Matz, Adolph, Othel J. Curry and George W. Frank. Cost Accounting. Cincinnati, Ohio: South-Western Publishing Company, 1962.

Mewha, Colonel John, USAF. Deputy Commander, AFCMD. "Overhead Management." Text of speech delivered in early 1975. Albuquerque, New Mexico.

Moore, Robert. Overhead Specialist, Air Force Plant Representative Office, General Dynamics, Convair Aerospace Division. Telephone interview, 9 May 1977.

Newner, John J. W. and Samuel Frumer. Cost Accounting Principles and Practices. Homewood, Illinois: Richard D. Irwin Inc., 1967.

Olofson, Colonel Tom O., USAF. Director of Contract Management, AFSC, DCS/Procurement and Manufacturing. Letter, subject: Case No. AFSC/OIS 76-1942, to AFSC/OIS, 22 December 1976.

Parker, John M., Jr. "An Examination of Recent Defense Contract Outcomes in the Incentive Environment." Unpublished Masters Thesis, GSM/SM/71-9, School of Engineering, Air Force Institute of Technology (AU), Wright-Patterson AFB, Ohio, September 1971.

Ratliff, Captain Hutson L., USAF. Overhead Management Division, Directorate of Pricing and Contract Management, DCS Procurement and Manufacturing, HQ AFSC. Telephone interview. 19 April 1977.

Reiser, Morris J. Chief, Contractor Overhead Division, AFCMD. Letter, subject: Advance Overhead Agreements, to AFSC/PPF, 19 November 1971.

"Report of Conference with AF Cognizant Contractors." Minutes of meeting held by Headquarters AFSC at AFCMD to discuss the advance overhead negotiation test plan with contractors. 28 March 1968.

Rierner, W. H. Handbook of Government Contract Administration. Englewood Cliffs, New Jersey: Prentice-Hall, 1968.

Scherer, Frederic M. The Weapons Acquisition Process: Economic Incentives. Boston: Harvard University Press, 1964.

Slinkard, Lieutenant Colonel John D., USAF. Director, Contract Administration Division, AFCMD. Letter, subject: Decreased Costs and Increased Profits Through Incentivized Overhead, Article Prepared by Colonel Talley and Captain Curry, Dated July 1976 (OI #76-396), to 4900 ABW/OI, 2 December 1976.

U.S. General Accounting Office. The Process of Identifying Needs and Establishing Requirements for Major Weapons Systems in the Department of Defense, B-163058. Washington D.C.: General Accounting Office, 1974.

Wells, George. Executive Secretary, Council of Defense and Space Industry Associations. Letter, subject: Comments on the Advance Overhead Negotiation Test Plan, to OASD (I&L) CD, 25 August 1968.

AUTHORS' BIOGRAPHICAL SKETCHES

1st Lieutenant Patrick J. Lynch received a Bachelor of Science degree with a major in Economics from the United States Air Force Academy in 1974. He has spent one year as a buyer and contract administrator for the Contract Airlift Division, Military Airlift Command and one year as a procurement officer for the 375th Aeromedical Airlift Wing at Scott AFB, Illinois. His next assignment is Deputy Chief of the Base Procurement Division, Rhein-Main AB, Germany.

Captain John M. Pace received a Bachelor of Science degree in Engineering Management from the United States Air Force Academy in 1973. He has served as a contract administrator in the Business Management Branch at the Air Force Plant Representative Office, Rockwell International Electronics Operations. At that same location he also performed duties as the Program Control Officer for the Deputy AFPR for Minuteman Office. Upon graduation he will be assigned as a buyer in the F-15 System Program Office, Aeronautical Systems Division, Wright-Patterson AFB, Ohio.