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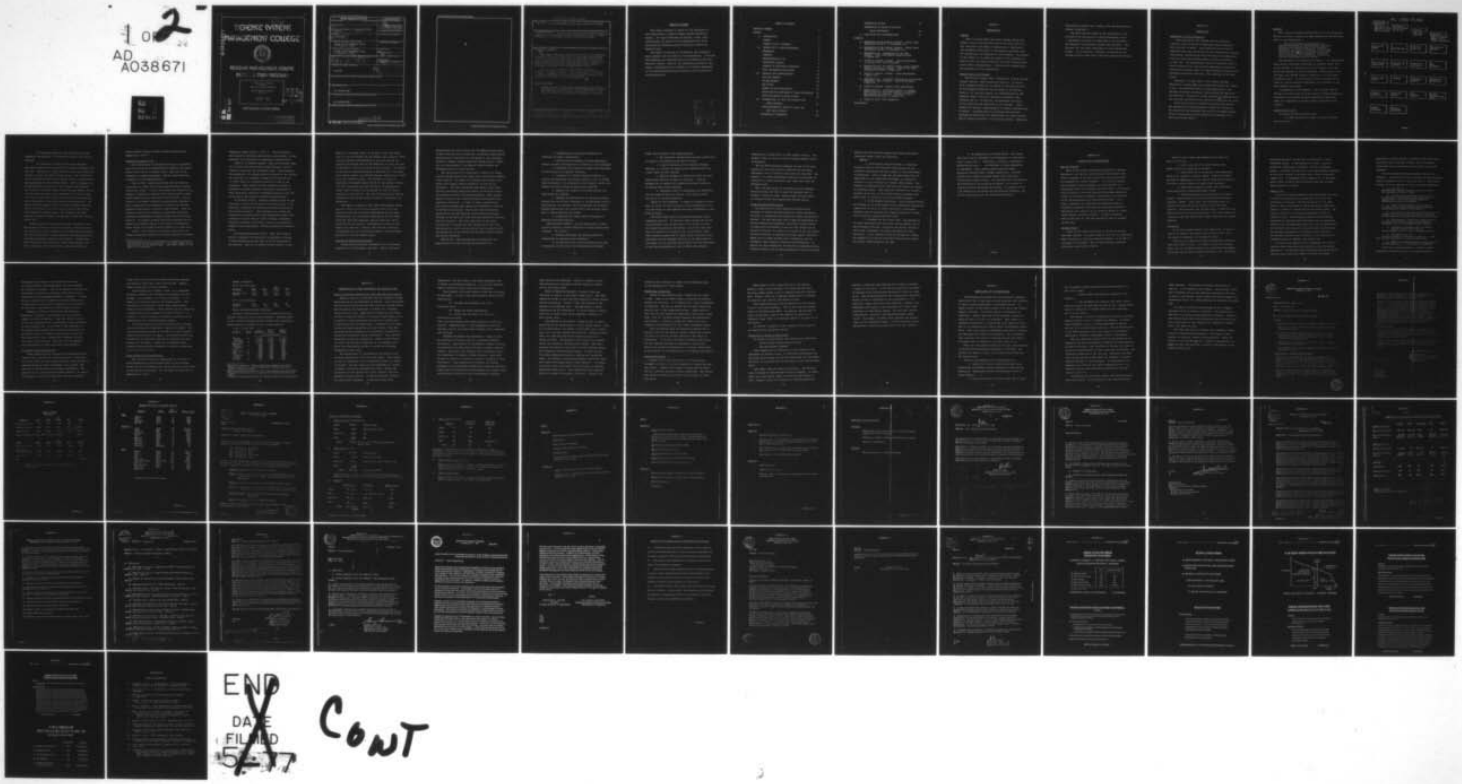

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

PROGRAM MANAGEMENT COURSE
INDIVIDUAL STUDY PROGRAM

VALUE ENGINEERING
IN THE
DOD ACQUISITION PROCESS

STUDY PROJECT REPORT
PMC 76-2

MICHAEL GLUCK
GS-13 DAC

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

STUDY TITLE: VALUE ENGINEERING IN THE DOD ACQUISITION PROCESS

STUDY PROJECT GOALS: Appraise the present overall Value Engineering program and to determine if Value Engineering is still a viable discipline in the defense systems acquisition process.

STUDY REPORT ABSTRACT:

The report describes Value Engineering from its conception and introduction into the defense systems acquisition process. The Value Engineering discipline, the emphasis, interest and image is described together with its interrelationships with other recent developed cost reduction techniques. Finally, the issue of revitalizing Value Engineering from top Government officials is addressed and recommendations offered.

The data and narrative in the report is based on interviews with key personnel in the Value Engineering Office of OSD, DA and DOD components. The revitalization and renewed interest is supported with copies (Appendices C through I) of memoranda and letters among OSD and DOD level.

SUBJECT DESCRIPTORS:

Subject report on Value Engineering pertains to the acquisition of DoD Defense Systems & Equipment and its interrelationship with other cost-reduction disciplines such as: Design-to-Cost and Life Cycle Costing; benefits and accomplishments, and methodology comparisons.

NAME, RANK, SERVICE	CLASS	DATE
Michael Cluck, GS-13, USA	PMC 76-2	Nov, 1976

EXECUTIVE SUMMARY

This report attempts to search out the usefulness of Value Engineering in today's Defense Systems Acquisition Process. The report describes the history, future inter-relationships and impact of Value Engineering with other cost-reduction techniques such as Life-Cycle Costing and Design-to-Cost.

The reader is directed to the benefits and accomplishments together with the trend of Value Engineering. Criticisms and weaknesses are contrasted with its successes to DOD Cost Reduction Program. Based on the information provided in this report, recommendations are offered to the Program Management in his decision-making process concerning the utilization of Value Engineering.

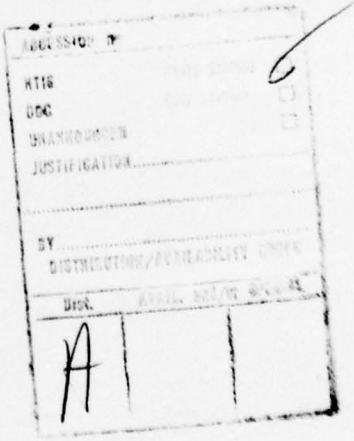

TABLE OF CONTENTS

EXECUTIVE SUMMARY		i
SECTION		
I.	INTRODUCTION	1
	PURPOSE	1
	CURRENT POLICY & GUIDANCE	1
II.	PERSPECTIVE OF VALUE ENGINEERING	3
	BACKGROUND	3
	CONCEPTS	4
	IMPLEMENTATION OF VE	4
	CONTRACTUAL ASPECTS	6
	CONTRACT VE PROVISIONS OVERHAULED	8
	VALUE ENGINEERING APPLICATION	12
III.	BENEFITS AND ACCOMPLISHMENTS	14
	PAST AND PRESENT	14
	ACCOMPLISHMENTS	14
	THE FUTURE	15
	TRENDS IN VALUE ENGINEERING	16
	CRITICISMS AND WEAKNESSES OF VALUE ENGINEERING	18
	VALUE ENGINEERING SAVINGS ACTIONS	19
IV.	INTERRELATION OF VALUE ENGINEERING WITH OTHER PROGRAMS	21
	VALUE ENGINEERING, DESIGN TO COST, AND LIFE CYCLE COSTING	21
	METHODOLOGY COMPARISONS	24

CONTRACTUAL ASPECTS 24

INTERACTION OF DESIGN TO COST AND

VALUE ENGINEERING 25

V. CONCLUSIONS AND RECOMMENDATIONS 27

APPENDIX

A. MEMORANDUM FOR MR GANSLER, SUBJECT: ANNUAL VALUE ENGINEERING RESULTS, 21 SEPTEMBER 1976.

B. MEMORANDUM FOR MR GANSLER, SUBJECT: ANNUAL VALUE ENGINEERING REPORT, 16 SEPTEMBER 1975

C. MEMORANDUM FOR: COMPTROLLER OF THE ARMY SUBJECT: VALUE ENGINEERING PROGRAM REVIEW, 2 JANUARY 1976

D. LETTER TO DACA-MP, SUBJECT: VALUE ENGINEERING, 14 JANUARY 1976 (WITH ENCLOSURE)

E. MEMORANDUM FOR: MR STANLEY NISSEL, DEPUTY GENERAL COUNSEL (LOGISTIC), SUBJECT: FUNDING FOR VALUE ENGINEERING EFFORTS, 2 MARCH 1976

F. LETTER TO DRCDE-E, SUBJECT: VALUE ENGINEERING, 2 MARCH 1976

G. MEMORANDUM FOR: ASSISTANT SECRETARY OF THE MILITARY DEPARTMENT (R&D), SUBJECT: VALUE ENGINEERING, 1 MAY 1975.

H. LETTER TO DACA-MP, SUBJECT VALUE ENGINEERING.

I. MEMORANDUM FOR: LIEUTENANT GENERAL H. COOKSEY, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT AND ACQUISITION, SUBJECT: FUNDING OF VALUE ENGINEERING PROJECTS, 7 JANUARY 1976

J. DESIGN TO COST, 1976 CONFERENCE

BIBLIOGRAPHY

SECTION I

INTRODUCTION

Purpose

There is little doubt that every economic system must sooner or later rely upon some form of the profit motive to stir individuals and groups to productivity. Substitutes like management supervision or ideological enthusiasm prove too unproductive, too expensive or too transient. The purpose of this report is to inform the reader to the importance of reducing cost via Value Engineering, to dispel misconceptions and to offer recommendations in improving the implementation and acceptance of value engineering.

Current Policy and Guidance

DOD Directive Number 5000.1 (Acquisition of Major Defense Systems) defines a major program in terms of: (a) dollar value (estimated RDT&E cost in excess of 50 million dollars, or an estimated production cost in excess of 200 million dollars); (b) national urgency; (c) recommendations by DOD Component Heads or Office of Secretary of Defense (OSD) officials and (d) "In addition, the management principles in this Directive are applicable to all programs." Under Section III (Policy), subparagraph C-4, Program Considerations, it states: "Programs shall be structured and resources allocated to ensure that the demonstration of actual achievement of program objectives is the pacing function. Meaningful

relationships between need, urgency, risk and worth shall be thereby established."

The above sets the stage for the utilization of the principles and applications of Value Engineering to wit: ...management principles are applicable to all programs... and meaningful relationships between need and worth. Need and worth are the prime ingredients of value engineering studies. The utilization, therefore, is imposed by the related directive DODD 5010.8, DOD Value Engineering Program.

SECTION II

PERSPECTIVE

Background of Value Engineering

Value Engineering (VE) emerged from the industrial community during World War II when many critical materials were difficult to obtain. This problem forced the use of substitute materials and designs by many manufacturing concerns. Surprisingly, manufacturers found that many of the substitute materials used were providing equal or better performance at less cost. The unintentional result of obtaining equal or better performance at less cost was subsequently followed by intentionally putting effort to improve product efficiency and developing substitute materials. Thus the birth of VE disciplines.

Enclosure 1 to DODD 5000.1 lists eighteen related directives, of which DODD Value Engineering Program No. 5010.8 is one. The cognizant office of Value Engineering is the Assistant Secretary of Defense (Installations and Logistics). The objective - eliminate or modify unessential characteristics and functions and minimize cost through the organized use of VE.

The policies stated in DODD 5010.8 ensure that systems and equipments are reviewed against "design to" objectives for acquisition and ownership cost and that VE supports these efforts, particularly during engineering development (Full Scale Development Phase).

Concepts

While there are numerous definitions of the VE disciplines, few are at serious variance with that contained in DOD Directive 5010.8, Value Engineering:

> The Value Engineering discipline is a sequential process for systematically analyzing the functional requirements of DOD systems, equipment, facilities, procedures, and material to achieve the essential functions at the lowest total cost of effective ownership, consistent with requirements for performance, reliability, quality, maintainability and safety.

The methodology is summarized in Figure 1. It incorporates many accepted individual techniques for reducing costs, such as the analysis of functions, the use of experts, cost visibility and appropriate use of standards. Essentially it aims to reduce cost through improved information: It challenges the design itself. It concentrates on the 20 percent of the items in a design normally responsible for 80 percent of the cost (PARETO's Principle).

It emphasizes a team approach. The "VE team" implies the use of various sizes of ad hoc groups of mixed engineering, production, and contracting skills applying VE techniques under the leadership of someone trained and skilled in VE methods.

Implementation of VE

VE can be applied in several ways:

(1) Train designers to apply VE as part of their day-to-day work.

VE JOB PLAN

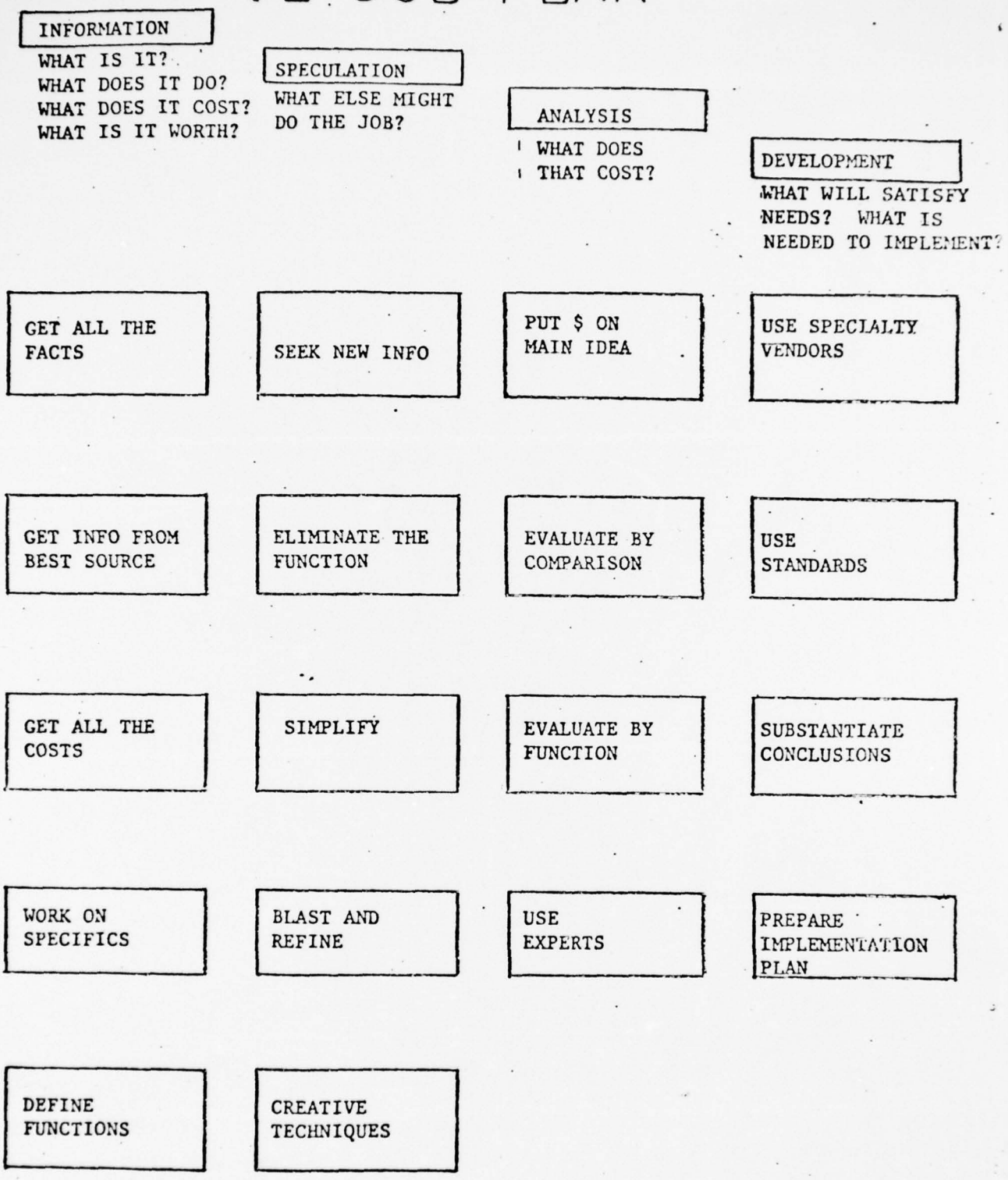

FIGURE 1

(2) Establish groups of value engineers who independently "second-guess" or redesign the work of the original designer.

(3) Implement a "middle of the road" approach. Advocates of the training approach cite designer responsibility for cost - designing it "right the first time" and consequently eliminate costly independent review groups. The "independent group" approach has had limited success except in organizations not responsible for the original design. This is probably due to design group resistance or a not invented here syndrome. The "middle of the road" school recognizes that despite efforts "to do it right the first time," problems in the form of high cost areas or new opportunities in the form of new technology, later information, still permit later cost improvements. The school advocates selective use of a form of design iteration, the VE "mixed skill" task teams as one means of addressing such problems or opportunities. The "middle of the road" approach attempts to support the designer, rather than "second guess" him.

Another concern is the subject of when and where in the design phase is VE most likely to be useful. This is a pertinent issue which raises questions of interrelationships between VE, cost effectiveness, systems analysis, and other analytical techniques generally employed in development. Studies show that VE tends to deal with detail rather than concepts, and might, therefore, be envisioned as a technique useful for

tasks somewhere between systems analysis and production engineering (12:9-1)[1]

Contractual Aspects of VE

Value Engineering in Government contracts is concerned with the elimination or modification of anything that contributes to the cost of a contract item or task, but is not necessary for needed performance, quality, maintainability, reliability or interchangeability.

Prior to 1963, contracting methods did not encourage contractors to submit cost savings proposals which required contractual action. In fact, the opposite was generally true because a reduction in contract price usually meant a comparable reduction in the contractor's fee or profit. The VE clauses in Government contracts are specifically designed to make it beneficial for contractors to submit cost savings proposals which require a change to the contract. These VE contract clauses invite industry to challenge unrealistic Government requirements and specifications and to profit by doing so. VE contract clauses reward the contractor when he submits an acceptable change to the contract documentation which results in an equal or better product at a lower cost.

POLICY - The policy and guidance for applying VE to defense contracts is covered in the Armed Services Procurement

[1] This notation will be used throughout the paper for sources of quotations and major references. The first number is the source listed in the bibliography. The second number is the page in the reference.

Regulation (ASPR) Section I, Part 17. Prime contractors are required to encourage subcontractor participation through extension of VE incentives to appropriate subcontractors.

TYPES OF VE CONTRACT CLAUSES - There are two basic types of VE clauses that may be used in DOD contracts - the VE incentive clause and the VE program clause. Both encourage the submission of VE change proposals pursuant to the contract VE clause that (1) requires a change to the contract and (2) would result in an overall reduction in cost to the Government. These savings include collateral savings in Government furnished property, operations, maintenance or other areas which exceed any increased acquisition cost and do not impair any essential function characteristics.

VE Incentive Clause. Incentive clauses provide for the contractor to share in any real savings which accrue to the Government resulting for contractor-initiated and accepted cost savings proposals. These proposals may include the elimination or modification of any requirements found to be in excess of actual needs in areas of design, components, materials, processes, tolerances, packaging requirements, technical data requirements, testing procedures and requirements.

VE Program Requirements Clause. When this clause is used in a contract, the contractor is obligated to engage in Value Engineering to the level of effort stipulated by his contract. This is in contrast to the incentive clause

which is a voluntary effort on the part of the contractor. Also in contrast between the two clauses; the incentive clause does not obligate the Government in any cost whereas the program clause would require the Government to cover the cost of VE effect to the level stated in the contract. The sharing of savings on accepted proposals is provided as in the incentive clause, however, the percent sharing would not be as high as in the incentive clause. The principal reasons for requiring a VE program clause are to (1) get earlier results, (2) aid a contractor who does not have a VE capability to staff, train personnel and accomplish VE, and (3) force a contractor to perform VE. The full VE benefits will then be reflected in the initial stages of design, development and production.

The advent of Design to Cost (DTC) requirements raised questions about the use of the program clause since the purpose of both the VE and DTC requirements are the same. Theoretically, the VE program clause should not be needed, since DTC tells the contractor the end objective, and he should be free to apply VE, standardization, and any other means as he sees fit. However, even with DTC, there may occasionally still be circumstances where a Program Manager may elect to use the Program Clause.

Contract VE Provisions Overhauled

Eliminating unnecessary requirements is a continuing objective of top management officials. Some of the major

manifestations of this interest are the emphasis being placed on more effective use of trade-offs, performance versus design specifications, application of the design to cost technique, reviews by Defense Systems Acquisition Review Council (DSARC) and the establishment of the Materiel Specifications and Standards Board and "murder boards."

How can contractors be motivated to submit cost saving contract changes which would reduce their current and probable future profits? The answer is by sharing the savings, thus making such changes mutually beneficial to DOD and the contractor. The Value Engineering provisions in the Armed Services Procurement Regulation (ASPR) are the major vehicle for assuring equitable cost savings sharing. After approximately 15 years of use, these provisions have recently been completely overhauled. In those 15 years, modifications were made but changes were generally represented as "add-ons" to the existing coverage. The current Value Engineering provisions in the ASPR might be called "second generation" coverage in the sense that they have been completely rewritten from the ground up. The major objectives in the recent revision were to improve DOD and industry use of the Value Engineering provisions through greater ease of administration and application and to promote more equitable sharing between DOD and the contractor.

EASE OF USE - The improved ease of application and administration of Value Engineering activities are:

o Standardization of sharing percentages to eliminate the need of negotiation.

o Structuring the language of Value Engineering clauses to permit incorporation by reference in most instances.

o Providing seven options to enable easy adjustment of the coverage to a specific situation.

o Inclusion of a special decision checklist to provide the procurement contracting officer a tool to rapidly check key points to be considered in the coverage, rather than reading the entire former lengthy policy statement.

o Reducing the length of the policy section and simplifying the language.

o Changing the sharing base for instant and future savings from the military department to the procuring activity which awarded the contract, and also changing the collateral savings sharing base from overall DOD to the military department or agency approving the change.

o Eliminating the former special treatment of government-furnished material.

MORE EQUITABLE SHARING - The new coverage has a number of major changes to increase benefits or to make sharing more equitable. For example:

o Sharing percentages and sharing periods are standardized to encourage early submission.

o The sharing period is now initiated at the date of acceptance of the first item incorporating the change

rather than the date of the change approval.

o The collateral savings share has been raised from 10 percent to 20 percent of one year's savings.

o Prime contractors are now required (formerly optional) to include a VE clause to his subcontractors with a cost figure of over $100,000.

o Explicit guidance on unsolicited VECPs has been added making sharing the same as collateral. Previous guidance was so general that operating personnel hesitated to process unsolicited proposals.

o Government costs for development and implementation are deducted prior to sharing, thus assuring actual sharing at the stated percentage.

DESIGN TO COST INTERFACE - A number of changes have been made to adjust the ASPR coverage of Value Engineering to fit with the design to cost approach now being implemented on most major programs.

The first change makes the Program Requirement clause completely optional. In the past, these clauses were by and large mandatory with contract price of $1 million or more. The clause was generally successful, but was not often used when the emphasis in development was on performance since their original purpose was to reduce future production costs. Such costs are now addressed directly in the application of the design to cost technique which should motivate contractors to use Value Engineering as well as other cost reducing

techniques as a normal part of their design activity. The program clause can still be used if program managers feel it is desirable.

The new ASPR provisions encourage the use of the Value Engineering Incentive Clause in advanced and full-scale development even if design to cost goals are specified. The purpose is to reduce development costs and to encourage the contractor to reduce production unit costs lower than the designated goal.

Also, the application of the design to cost technique should alleviate the fear of some DOD personnel that an unethical contractor might "design stupid and build smart" to increase future Value Engineering proposal profit.

Value Engineering Application

The application of Value Engineering should not be confined to changing existing designs to achieve reduction. The costs of redesigning and testing may offset any potential savings. The most opportune time to apply VE methodology is during research and development, especially during advanced or engineering development so that any cost savings can be realized throughout the complete life cycle of the end product. The basic objective in applying VE during research and development are to reduce the high cost of production and the consequent costs related to operation and maintenance. To achieve the basic objectives, VE should be accomplished before production begins, before interchangeability factors are found,

before field and technical manuals are drafted and before logistical support plans are finalized.

METHODS -

o VE Functional Analysis Studies - A detailed evaluation made of the functional requirements and the technical requirements and their effect on total performance is determined. Areas of high cost and high sensitivity are identified and the associated requirement is examined in relation to its contribution to systems effectiveness. The elements of disproportionate high cost then become the subject of additional study. This analytical evaluation of function provides useful data on the optimum system arrangement and system cost is introduced as a basic design parameter.

o VE Development Department - Value engineers should be assigned as full-time members of the development engineering organization to serve as value consultants in developing alternate ways of providing the required function at a lower cost in order to reduce production costs.

o VE Member on the Project Team - The approach is to form a developing team that would include members such as the development engineer, production and quality engineers. Since these individuals are mostly concerned with their speciality, a value engineer should be assigned as a member. His specialty in value and functional analysis will improve the overall effectiveness of the team.

o VE Consideration at Review Points - The review and control points throughout the development and acquisition cycle to prove concept feasibility, validation, development and production would be more effective if Value Engineering is considered. Major systems undergo Defense System Acquisition Review Council (DSARC) examination. Non-major systems must undergo In-Process Review (IPR) examination. VE involvement might include: (1) procedures for incorporating VE considerations into existing procedures, (2) perform VE analytical effort preceeding the reviews, (3) prepare and use a VE checklist by the design and specification personnel, and (4) VE representation on the various review boards.

SECTION III

BENEFITS AND ACCOMPLISHMENTS

Past and Present

While VE has gained increasing recognitions in Defense Department, even the most avid disciples would concede that many VE programs are at best lip-service affects maintained by management for "image" purposes. It has not yet gained full acceptance among management and line personnel as a methodology useful for attacking high cost areas. Its contractual provisions in the Armed Services Procurement Regulation (ASPR) are frequently ignored by contractors or circumvented by DOD program managers and contracting officers. It is widely regarded as an unwelcome and bothersome burden by overworked management, technical and procurement personnel. Some people even regard it as an insidious scheme to unjustifiably enhance contractor profits. It would, therefore, seem to some that VE, like many managerial fads is destined to fade away.

Accomplishments

Since FY 1963 almost $3 billion in audited VE savings have been reported. In terms of growth in FY 63, VE represented about 10 percent of the Cost Reduction Program. In FY 1968 it increased to 15 percent. Most of these savings originated internally within the DOD (4:215)

Benefits which result from industry VE activity can occur in four ways:

o Contractors use VE to lower initial bids. These savings are impossible to measure.

o Contractors use VE to generate cost reductions which do not require a contract change. Although DOD does not benefit immediately in this case on fixed price contracts, the effort usually results in lower future contracts.

o Contractors generate savings under DOD-funded Value Engineering Program Requirement clause.

o Contractors generate savings under VE incentive clause. These savings are called Value Engineering Change Proposals (VECPs). Since 1965, over 4500 VECPs worth an estimated one-quarter billion dollars to DOD have been approved. The contractor has averaged about 26 cents for each dollar saved during the sharing period. The record shows that contractors who have applied VE to their contracts are reaping benefits.

The Future

To see the possible future of VE application, we need to examine the general environment within which VE will live, the assets VE possesses, and current VE trends.

Factors in the general and overall management environment which will affect VE are: (1) greater concern over defense costs, and (2) continued growth in our technology development. The second factor favors continued survival of VE. As science

and technology grow, so does the VE opportunity. VE has formidable assets. It has definition, policy, direction, procedures, methodology, handbooks, contract incentives, people, a technical society and an evolving management approach. At the level at which it performs best, VE has no existing competition. If management sees a need for VE, it therefore seems logical to build upon an existing base than to start from scratch with nothing.

Trends in VE

One of the stumbling blocks to earlier progress was lack of effective approach to the integration of VE into the mainstream of activity. The old picture of VE as a small group of people independently "second-guessing" production items is a "Model T" version that is now largely passe. The current trend has the VE group operating as a staff and catalytic agent. Value engineers assist line and program management in achieving goals delegated from top management. Resources are allocated specifically to find VE opportunities by reviewing high cost areas, by questioning specifications, by applying new advances in technology and by searching for possible economies due to changes in the users needs or knowledge gained in feedback from test or use.

In the current approach to VE, management sets goals to motivate widest possible participation by line and program management. A viable DOD Value Engineering Program during the next ten years should be capable of saving the Defense

Department a billion dollars in resources each year (8:46). This based upon VE savings in-house, use of VE program requirement clause and contractor-initiated cost savings proposals.

The Value Engineering Program stands today at the threshold. The severely limited economics of defense dictate growing management need for this type effort. The growing interest in VE is apparent from the following statements:

a. GSA (Feb 73)
Administrator Sampson announces plans for VE in all remaining sections of GSA.

b. EIA Government Relations Council (Jan 75)
VE performance under ASPR mutually rewarding..., continuation...with even greater degree of effectiveness would be desirable.

c. Reply to Renegotiation Board (Feb 75)
"To remove VE payments through your proceedings could seriously jeopardize VE program."

d. AIA Technical Requirement Committee (May 75)
"Concern for several years that neither industry or the government was receiving full value from VE."

e. NSIA Design to Cost Panel (Report Feb 75)
"It would seem obvious to apply any expertise developed in VE to the Design to Cost process."

f. DSB Report (Reducing Costs of Defense Systems Acquisition - Mar 74)
"Such programs as VE..., are of undoubted value."

g. DSA Report (Mar 74)
"We have allowed this program to decline..., give this program opportunity to realize potential."

h. DSARC Cost Reduction Working Group (Dec 75)
"Revitalization of.... VE Program is required."

Convincing a Program Manager to include a Value Engineering Program Clause into a proposed contract,

accomplished by inserting a line item for some value of level-of-effort, was considered by the value engineer as a "moment of victory." This is so because VE does not get the emphasis necessary at the major review points and in particular when the program budgeting is prepared. If funds are not allocated for VE, whether it be for contractual or in-house effort, any success in applying Value Engineering at some future time would be met with negative results.

However, in review of the letters and memoranda, Appendices C through G, the emphasis and top management support is being revitalized. Funds are needed to pursue in-house VE projects for it is here where a good percentage of cost savings occur. It is noted in the memoranda for Mr Stanley Nissel, Deputy General Counsel (Logistics) and Lieutanent General H. Cooksey, Deputy Chief of Staff for R&D, Appendices D and I, respectively, address the topic of funding for VE projects. This will give new emphasis and encouragement to those practicing value engineers.

Criticisms and Weaknesses of VE

Value Engineering cost savings have traditionally been reported under the DOD cost reduction program. During the early years there was considerable emphasis toward making the reported safings as large as possible. As a result, some reported VE savings were not true Value Engineering. The image of VE as a cost reduction program suffered. To correct this problem, a new set of reporting rules were issued to

insure that only true VE cost savings were being reported. The immediate effect was a drop in VE savings. However, these savings were much more credible.

Value Engineering is based, in part, on a philosophy of modern technology and innovation as techniques for cost savings. VE, by nature, is a "strap on" program. It is based on an iterative review of an on-going effort. The introduction of VE impacts on many other organizational functions than engineering. Those affected may not always see or appreciate the cost savings to be derived from VE. As a result, it is not uncommon to encounter resistance to the implementation of a Value Engineering change.

The design engineer may resist having another engineer (the value engineer) attempting to improve his design. The contract administration may not welcome the contract modification resulting from a VE change. Cost analysis people may not welcome the additional workload of validating the cost savings of a VE change. Middle and top management must recognize these potential roadblocks to obtain an aggressive Value Engineering program.

Value Engineering Savings Actions

The ultimate criterion in appraising the viability of Value Engineering in the DOD acquisition of major weapons systems is in the estimated cost savings reported to the Office of the Secretary of Defense. For the datail savings refer to Appendices A, B and J.

ANNUAL VE RESULTS:

FY 76 ($ in Millions)

In-House	Army	Navy	Air Force	DSA
Average 1 yr	112.7	47.7	171.5	48.7
VECPS*	16.5	10.0	20.6	0.5

FY 75 ($ in Millions)

In-House	118	72	182	46
VECPS*	16.8	4.6	18.4	1.6

*Value Engineering Chance Proposals

Industry's participation in Value Engineering has been sporadic during the life of the VE program. Notwithstanding are the results of Hughes Aircraft Company Value Engineering change proposals accepted during a 12-month period.[1]

1 Jan - 31 Dec 1975

Program	VECPS	Cost Reduction	Govt's Share	Hughes Share
		($ in Millions)		
TOW Msl	8	6.056	2.924	3.144[2]
Royalty		12.530	6.265	6.265[3]
F-15 Radar	4	13.450	12.110	1.340[4]
MAVERICK		1.720	.763	.507
Sheridan	2	.008	.004	.004
Royalty		.003	.002	.001
B-52	1	.014	.007	.007
TOW Cobra	1	.009	.002	.007
LWLD	18	.030	.022	.008[5]
Royalty		2.800	2.200	.600
CV/TSC	1	.020	.009	.011
IPD/TAS	2	.036	.018	.018

[1] Extracted from Pub., "Value Engineering Digest, Apr 1976."
[2] Instant contract savings and projected royalties based on current production rates.
[3] Royalty payments received in 1975 from previous accepted VECPs.
[4] Negotiated settlement for royalties from previously accepted VECPs.
[5] Projected royalties based on tri-service order of 3600 systems.

SECTION IV

INTERRELATION OF VALUE ENGINEERING AND DESIGN TO COST

Value Engineering Design To Cost (DTC) and Life Cycle Costing

Design to Cost is a relatively new cost reduction concept being employed by the Department of Defense. Value Engineering and Life Cycle Costing are also cost reduction concepts having been utilized by the Department of Defense for a somewhat longer period of time. Application of Design to Cost within the DOD is currently limited to the major weapon system level. In contrast, Value Engineering and Life Cycle Costing have a much broader base of application: The objectives of Design to Cost and Value Engineering are very similar. Both cost reduction programs recognize the desirability of reducing or eliminating unnecessary design requirements. Only essential performance levels are justifiable. Design to Cost strives to achieve the necessary capability at an acceptable cost while Value Engineering strives to provide the necessary capability at least cost.

Any dissimilarity in the objectives of Design to Cost and Value Engineering is with the cost factor. Under Design to Cost the acceptable cost is established before the design is started. The cost figure may be established as a target, a ceiling, or even an acceptable cost range. Within the constraints of the defined cost figure, however, that cost becomes a design parameter. It may be explicitly stated in the contractual instrument. In contrast, under Value

Engineering, the least cost is the lowest achievable cost to obtain the necessary capability. No firm cost objective need be explicitly stated under Value Engineering.

The acceptable cost under Design to Cost may not always be attainable. In such a case there would be three possible alternatives:

(1) Increase the acceptable cost to an attainable level.

(2) Reduce the design requirements

(3) Discontinue the effort for lack of a satisfactory solution.

Under Value Engineering there would always be a least-cost solution. Hypothetically, a Value Engineering least-cost solution could be even lower than a Design to Cost acceptable cost solution.

INTENDED ENVIRONMENT FOR APPLICATION - Design to Cost was conceived to function best in a relatively flexible environment. Requirements for performance, schedule and cost are expected to be sufficiently flexible to permit trade-off studies. The design team should be free to exercise innovative approaches to achieve a viable solution. Value Engineering is capable of operating in either a flexible or rigid environment. Value Engineering's potential is actually broadened as the environment becomes more rigid and arbitrary. A key facet of Value Engineering philosophy is to attack rigid and arbitrary requirements such as performance, schedule,

specifications and standards. Similar to Design to Cost, Value Engineering encourages trade-off studies to improve utility and reduce costs.

LEVEL OF PRIMARY APPLICATION - Design to Cost was conceived to operate at the weapon system level. DODD 5000.1 identifies Design to Cost with cost reduction in Major Defense Systems Acquisition. Design to Cost could operate at the component and subsystem level. The application of Value Engineering has few constraints. It can be used as a management tool to reduce costs at the component, subsystem, or major system level.

TIME PHASING OF APPLICATION - Design to Cost is implemented during the design phase of a major weapon system. Prior to the design phase, the Design to Cost figure (e.g., target, goal, etc.) has been defined and specified. During the design phase that specified cost figure becomes operative as a design parameter. The potential cost reduction is oriented toward the production and operational phases. DODD 5000.1 intended that Design to Cost result in cost reduction during both production and operational phases. To date, however, the primary emphasis has been on reducing unit production costs. The problem of quantifying probable operational phase costs during the design phase is most difficult. It remains to be seen if any real success will be enjoyed in reducing operational phase costs. Value Engineering can be applied during all phases of a system's life cycle. Further, the

resulting cost reduction can apply to the immediate phase or any combination of later phases.

Methodology Comparisons

Design to Cost operates under a specified cost target or goal. There is no formal method or required procedure to achieve the cost goal. It is essentially a case of management by objective. The goal is defined but the means toward that goal are left to the responsible manager. Under Design to Cost the cost goal becomes an objective of the primary design team. Cost is a co-equal design parameter with performance and schedule. A design is simply not viable until cost, schedule, and performance all fall within acceptable bounds.

Value Engineering does not necessarily operate with a specific cost goal but seeks to attain a least-cost solution. The means for arriving at that solution is the formal VE methodology. VE is often perfromed by separate organization but this approach provides an independent "second look." There is no absolute requirement for a separate organization - VE can function as an integral part of the design team effort.

Contractual Aspects

Design to Cost must become part of the contractual Statement of Work if it is to be applied to a design development effort. Specific cost targets or goals must be stated and cost reduction objective clearly understood. The contract must specify methods for measuring the attainment of these cost goals.

Under Design to Cost, there need not be any special monetary reward to the contractor for achieving cost goals. The goals simply become a part of required contractor performance. However, there is no apparent prohibition to utilizing an incentive type contract with Design to Cost.

Value Engineering must also be specified in the contract if VE is to be made mandatory. This is true with the Program Clause in accordance with ASPR. In addition, the optional VE effort can be made a part of the contract by using the VE Incentive Clause (This is a voluntary effort on the part of the contractor).

In contrast to Design to Cost, savings accrued under VE are shared by the contractor and DOD.

Interaction of Design to Cost and VE

To analyze the interaction, the following are considered:

Can VE operate without Design to Cost?

Can they operate together?

Value Engineering can function as a cost reduction tool independent of Design to Cost. It functioned successfully for many years before Design to Cost was implemented via DODD 5000.1. The merits of utilizing both VE and Design to Cost are discussed below.

DODD 5000.1 does not mention VE directly. The DOD handbook for Design to Cost mentions VE inly in passing. It seems clear that there was no intent to relate VE with Design to Cost. However, there is no specific or implied prohibition

barring a contractor from applying VE as a means to achieve a Design to Cost goal. It can also be argued that any effect of reducing costs during design-development effort is a form of VE. Such reasoning suggests that contractually specifying Design to Cost is tantamount to also specifying VE. To explicitly require both would seem redundant. However, such redundancy would apply to cost reductions for future years - production and operational phases. VE could still operate independently, focusing on the design-development phase itself. For example, VE might reduce hardware and software costs for the development phase. In this case both would be appropriate to function concurrently on the same contract.

SECTION V

CONCLUSIONS AND RECOMMENDATIONS

Value Engineering emerged from the industrial community during World War II when many critical materials were difficult to obtain, making substitution a necessary solution. In today's market, VE has proven itself to be one of the soundest economic ventures. Its overall record of performance is impressive. Records show that VE has produced a return of anywhere from 2:1 to 20:1 on investment. When viewed as a management discipline, it utilizes the total resources available to an organization to achieve broad top management objectives. Thus, VE is seen as a systematic and creative approach for increasing the "return on investment." VE is concerned with acquiring good value by investigating what the product or process does in relation to the money spent on it.

What can a DOD program manager do to assure implementation of the new Value Engineering provisions in the ASPR? His actions will depend, in part, on the size of his office and the program phase.

Some key recommendations for consideration are:

- o Ensure the contract contains equitable Value Engineering requirements mutually beneficial to DOD and the contractor. Sharing must offset the contractor's loss of future profits.
- o Tell the contractor and your staff that you want

the VE program to work and review actively periodically to make sure it does.

o Ensure prompt and objective evaluation of VE proposals.

o The new ASPR still contains some "gray" areas - situations where the ASPR does not seem to fit. Resolve these with the contractor in a manner which does not discourage him in the VE effort.

The concept of the Value Engineering incentive is gaining greater support in both Government and industry. A Federal Value Management Council is being established to promote the use of VE in more Federal agencies. The new VE provisions in the ASPR represent a major step forward in providing a mechanism to eliminate unnecessary contract requirements.

The cost reduction program should be established by top management and have the emphasis, attention and administration of senior officials. Cost reduction via VE must be viewed as the normal responsibility of every supervisor and manager, from first-line supervisor to the very top. Experience has shown that reviews monthly or more often are necessary to sustain required interest in the VE program. If responsibility is assigned to an official with other responsibilities, it is unlikely that the cost reduction VE program will receive adequate attention.

During the past ten years, several cost saving programs have been created. VE has frequently been identified with

these programs. The latest and probably the hottest of them all, is the Design to Cost program. With the fast rising cost of defense and the fast declining availability of money to pay for the numerous, urgent needs, cost finally became the determining factor in a large percentage of decisions that were made.

In order to avoid the ups and downs of VE, it appears advisable for VE to stick to "its guns" - the teaching and application of creative problem-solving techniques. Design to Cost program deals with cost acquisitions and cost follow ups, with translations of cost elements into "design to" requirements, all tasks for cost.

VE's main task lies in teaching and in helping to apply creative problem-solving techniques. The Design to Cost program, in contrast, creates new requirements. While the Design to Cost program asks for a change in requirements, VE shows the best ways and means to fulfill requirements at the lowest possible cost.

APPENDIX A

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

INSTALLATIONS AND LOGISTICS

21 SEP 1976

MEMORANDUM FOR Mr. Gansler, DW

THRU: Mr. Shorey, WR

SUBJECT: Annual VE Results - Proposed DW Review

We have summarized the annual Service VE reports.

A. Facts

1. No dramatic change in savings, training, or manpower, last year.

2. VE funding set-asides were almost nil (Army and Air Force may do better this year).

3. We invested about $10 million in direct costs to implement in-house proposals worth $380 million, and about $9 million on VECPs worth $47.6 million (see Enclosure One). Comments on ROIs are in Section B below.

4. Navy was low on investment and low on both in-house and VECP savings (see Enclosure One).

5. Wide VECP variations by major programs (see Enclosure 2). Navy again appears worst.

B. ROI Analysis: How Much Could We Invest?

The figures in A.3. above give us an ROI of about 33 to 1 for in-house, and 5 to 1 in VECPs. The first figure is probably high (direct costs only measured; reporting not complete since first year reported), while the second figure is low; it does not include contractor share (usually 50%), or DoD savings after sharing period ends (e.g., DoD saved $37 million on TOW after sharing ended).

Thus, our in-house ROI is probably 15 or more to 1 and VECPs are 10 or more to 1. However, it would be a mistake to invest solely in-house or in VECPs since the opportunities are somewhat mutually exclusive.

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

For example, it's difficult to do an in-house analysis on subsystems or parts on the F-15. Only the contractor has the facts necessary. On other studies it's the reverse.

Lastly, we might "ball-park" investment levels to strive toward. The $47.6 million in VECPs is from roughly $21 billion in FY 75 procurement, or 0.25 percent of the account. Hughes figures (a success story) indicates VECPs are about 3.5 percent of military sales. If we set a target to offset one-third of annual cost growth (300 million) we'd need an investment of at least $30 million (at 10 to 1 return) or a little over one million per major system. In-house is more difficult to quantify. There are big hunks of logistic money in the $380 million. Based on informal Service inputs, we could easily double our investment with benefit. This would give us a long range total VE funding objective of $50 million annually as a target to shoot for.

C. Suggested Actions

Last year, as directed by the Bennett-Currie memorandum, you personally reviewed the Service programs. This did some good, particularly in the Air Force and Army. At that time you suggested we do this again (the new DoD directive states that we will review Service results and future plans).

If your schedule permits, I'll set up a half hour review for each Service again. If not, I'll try to handle it by correspondence, summarizing results and pointing out areas needing corrective action.

R. E. Diedenbender
Assistant for Value/Cost Engineering
Directorate for Acquisition and
Support Planning

Enclosures (2)

cc:
Mr. Trogdon
Mr. Myers
Mr. Pyatt
Mr. Mittino

APPENDIX A

1976 VE SAVINGS
(Millions)

In-house	Army	Navy	Air Force	DSA	Total
Direct Investment	4.4	0.7	4.0	0.2	9.3
Savings (1 year)	112.7	47.7	171.5	48.7	380.6
Savings Trend	-5.3	-24.3	-10.5	+2.7	-37.2
ROI (Excludes DSA and Navy R&D - costs not known)					33 to 1

VECPS	Army	Navy	Air Force	DSA	Total
Direct Investment	1.8	1.4	5.8	0.04	9.04
DoD Savings (Average 3-year)	16.5	10.0	20.6	0.5	47.6
Savings Trend	-0.3	+5.9	+1.8	-1.1	+5.2
ROI					5 to 1*

* Does not include contractor share or DoD savings after sharing ends.

ENCLOSURE 1

APPENDIX A

FY 1976 VECP RECORD -*BY MAJOR PROGRAMS

	Program	Phase	No. Approach	$ Value (DoD)
NAVY				
	Harpoon	Prod.	1	200K
	FFG 7	Prod.	3	160K
	AS 39-40	Prod.	13	268K
	SSN 688	Prod.	2	24K
AIR FORCE				
	F-15	Prod.	15	14,138K
	AWACS	R&D	2	1,490K
	OTH RADAR	R&D	7	850K
	MM III	Prod.	7	568K
	A-10	Prod.	2	551K
	Maverick	Prod.	4	145K
	AFSATCO	R&D	1	107K
	DSCS III	Prod.	5	48K
	AFSATCOM	R&D	1	7K
	Simulator	R&D/Prod.	2	2K
ARMY				
	Dragon	Prod.	5	1,322K
	Hawk	Prod.	23	584K
	Lance	Prod.	5	19K
	TOW	Prod.	14	519K
	M 60 Tank	Prod.	34	323K
	Ammunition (all)	R&D & Prod.	106	6,564K
	Pershing	Prod.	11	51K
	Target Systems	Prod.	1	102K
	2.75 Rocket	Prod.	3	165K
	Chaparral		2	15K

* If not listed, results are zero.

APPENDIX B

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

INSTALLATIONS AND LOGISTICS
WR

16 September 1975

MEMORANDUM FOR Mr. Gansler
THRU Mr. Shorey

SUBJECT: Annual Value Engineering Report

Attached is a summary analysis of the annual Service and DSA VE reports for use in conjunction with the VE reviews we have scheduled.

(a) Inclosure 1. Total DoD
(b) Inclosure 2. Army
(c) Inclosure 3. Navy
(d) Inclosure 4. Air Force
(e) Inclosure 5. DSA

FY75 represents a pivotal year in the sense that we issued a lot of new guidance to reorient the program. The statistics show some response to our new directive but it is really too soon for final judgment. A "capsule" summary follows:

In-house Savings. $418M - best year since FY72

VECPs. $41.4M - worst year since FY67 - but DCAS VECP receipts up for first time since FY71. We may therefore be turning the corner.

Training. Inclusive, a little more VECP training, which is needed.

Manpower. Further deterioration, particularly in the Navy. Down now to 156, about one-third total in 1969. Cuts now are hurting.

Biggest Problem. Navy; down in virtually everything. Funding (all Depts).

Biggest Opportunity. VECPs on major programs.

If you desire more information for the reviews, please advise. I will have the back-up data available.

R. E. Biedenbender

Incls (5)

AMERICAN REVOLUTION BICENTENNIAL 1776 1976

APPENDIX B

OVERALL DOD PROGRAM (FY75)

1. In-house Savings (One full year)

Army	$118M	About average
Navy	72M	Down last two years
Air Force	182M	Up
DSA	46M	Up
Total:	$418M-	Best year since FY72 even with tighter ground rules.

2. VECP Savings to DoD

Army	$16.8M	About average
Navy	4.6M	Lowest since FY67
Air Force	18.4	Lowest since FY68 - $63M in FY71
DSA	1.6M	
Total:	$41.4M	Lowest since FY67

Trend downward since $94.5M in FY71; DCAS VECP receipts turned up this year for first time since FY71; this may signify a "turn-around".

3. Training

	VE Methods	VE Clause	Identification
Army	394 down*	46 up	489
Navy	134 up	0 none for 5 years	25
Air Force	179 up	120 up	1216
DSA	48	0	314
Total:	455 down slightly	166 up	2044

* Army has done most here historically

4. Manpower (Full-time)

	Present	Reduction Since 69	Reduction Since 74
Army	79	102	14
Navy	22	4	26
Air Force	18	147	2
DSA	37	58	increase of 1
Total:	156	311	41

Comment: Reductions have slackened off except in Navy. While we certainly did not use all of the 467 on board in FY69, we are now probably at the point where more cuts will hurt program. This has already happened in Navy and AFSC.

5. VE in R&D vs VE in Production

About 20 to 25% of Army VE activity is prior to production in support of DTC (they have VE people in R&D). About all Navy (except construction) and Air Force VE still in production.

6. "Tiger Team" project

Ratio of proposals to studies is almost one-to-one in all Departments indicating little use of the PESO "tiger team" approach.

APPENDIX B

ARMY

Summary

- Best all-around program of three Services
- Most people
- Most VE methods training
- Steady results in-house and VECPs
- Savings audited
- VE transferred to R&D to support DTC; 25% of VE action now prior to production

Problems

- Larger VECP potential - light on VECP training
- Funding problem although they have made some progress and are working on it.

APPENDIX B

NAVY

Summary

- Worst of three Services
- Last in-house and VECP savings (lowest since 67). Historically worst in VECP savings. General downward trend coincides with decrease in management support and manpower cuts.
- No VECP training reported since 1970.
- No funding effort underway.
- Largest VE manpower cut since 1969.
- Largest VE manpower cut in FY75 (one-half).
- Historically good on VE methods training.

Problems

- No management support or direction except in NAVAIR.
- Manpower (focal point to OSD is part-part-part-time).
- No VECP training.
- No funding.

APPENDIX B

AIR FORCE

Summary

- Second best program of Services.
- Program degenerated in AFSC since FY71 when VE manpower drastically cut. HQ USAF trying to rebuild in last several years with some success.
- Best VECP producer historically, but steady downward trend since $63M in FY71. FY75 worst year since FY68.
- Most in-house VE in AFLC; little in AFSC.

Problems

- AFSC manpower
- VECP downward trend
- Funding - although they too are working on it and have made some progress.

Inclosure 4

APPENDIX B

DEFENSE SUPPLY AGENCY

Summary

- Historically a pretty good program. Now has personal support of General Robinson.
- In-house and VECP savings and Manpower up as result.
- Deserves a "well done".

Problem

- No known action to establish VE funding.

APPENDIX C

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

2 JAN 1976

MEMORANDUM FOR: COMPTROLLER OF THE ARMY

SUBJECT: Value Engineering Program Review

I read with concern Jacques Gansler's memorandum on above subject. As you well know, I have considerable interest in the Army's VE program and in the savings it generates.

With regard to shortage of funds for VE studies, has any consideration been given to using techniques similar to those of our Quick Return on Capital Investment Program? If a line item were set aside in each benefitting appropriation to finance the studies, on a two-year payback, our returns should even exceed our Capital Investment Program savings.

I am interested in your comments on this problem and also on planned improvements to the VECP side of our program.

Hadlai A. Hull
Assistant Secretary of the Army
(Financial Management)

APPENDIX D

DEPARTMENT OF THE ARMY
OFFICE OF THE COMPTROLLER OF THE ARMY
WASHINGTON, D.C. 20310

DACA-MP

14 JAN 1975

SUBJECT: Value Engineering

SEE DISTRIBUTION

1. At the request of Dr. Currie, Director of Defense Research and Engineering; and Dr. Bennett, Acting Assistant Secretary of Defense (Installation and Logistics), a briefing was recently presented to Mr. Gansler, Deputy Assistant Secretary of Defense (Materiel Acquisition) by members of my staff on the current status and future plans for Army Value Engineering activity. The presentation was favorably received and Mr. Gansler extended his appreciation to those Army personnel who made VE achievements possible. It is a pleasure to express my appreciation and congratulations to your command for your FY 1975 accomplishments.

2. Mr. Gansler's comments on the briefing were summarized in his 12 December 1975 memorandum (Incl 1). Two areas of major concern were noted:

a. Funding of VE investments.

b. Savings from Contractor Value Engineering Change Proposals (VECPS).

3. Continued emphasis at this Headquarters regarding the need for funding of VE investments will result in the incorporation of guidance on Value Engineering in the January 1976 Program Budget Guidance for major Army commands. The feasibility of other funding procedures specifically tailored to VE are currently being reviewed at this Headquarters.

4. As Mr. Gansler points out, the TOW Program has shown outstanding VE results, but other program managed projects do not appear to have adequate VE activity. This points up the urgent need for personal involvement by the program manager. Contractors are particularly sensitive to the desires of the program manager and respond when emphasis is stressed on a given aspect of the program. This is especially true with the VE incentive clause where a contractor's participation is strictly voluntary. I appeal to all program managers to make a

DACA-MP 14 JAN 1976
SUBJECT: Value Engineering

critical examination of their program and take necessary actions to improve VECP savings. All key program, procurement and technical managers should be provided copies of Mr. Gansler's memorandum. They should be advised of the increased emphasis on VE and the requirement for increased contractor motivation by appropriate use of VE contract incentives. Attached (Inclosure 2) is a list of typical actions recommended to increase VECP savings.

5. We must convey to Army contractors in all areas a desire for increased Value Engineering activity on their part. Each individual at the command-Industry interface must emphasize to contractors within his purview the Army's desire for intensive performance under the VE provisions of their contracts. In order to maximize the mutual benefits that will accrue, Army personnel must demonstrate a willingness to accept constructive change and assist contractors desiring to formulate VECPs.

6. Mr. Gansler will review in March 1976 the Army's progress toward solving the areas of major concern cited in paragraph 2. Comments with respect to efforts taken or planned by activities under your command to improve VECP savings and VE funding are requested by 9 February 1976.

2 Incls
as

Joseph H. Sherick
Acting Comptroller of the Army

DISTRIBUTION:
Chief of Engineers
Ballistic Missile Defense Program Manager
Commanders
US Army Materiel Command
US Army Communications Command
US Army Security Agency

APPENDIX D

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

INSTALLATIONS AND LOGISTICS

12 DEC 1975

MEMORANDUM FOR LTG John A. Kjellstrom
Comptroller of the Army

SUBJECT: Value Engineering Program Review

I have recently completed my annual review of the Service Value Engineering efforts, as directed by Dr. Currie and Dr. Bennett in their memorandum of 1 May 1975. A summary of overall FY75 DoD VE activity is enclosed.

I was pleased to see that the Army is vigorously pursuing a sizeable, on-going Value Engineering effort during this period of tight budgets. I was particularly interested to note that about one-third of the Army effort occurs prior to initiation of production, and that most Army Materiel Command VE personnel are now located in the R&D organization to better support our Design to Cost policies.

I found two areas of major concern. The first area is the issue of funds set aside for VE investment. While I recognize that this is a difficult problem, further progress is essential in this area.

The second area of concern is VECP savings. This appears to be a major opportunity for improvement. The TOW has had outstanding results, but other program managed projects appear to have little or no activity. This problem appears in part to be related to the funding problem.

I understand that while the Army recognizes the need for improvement in these two areas, I believe it would be beneficial to review progress with you in these two areas in March of this coming year.

I recognize that the size and scope of the Army's VE effort would be impossible without the support of management and dedicated execution on the part of operating personnel. Please extend my appreciation to these people for making these achievements possible.

BEST AVAILABLE COPY

JACQUES S. GANSLER
Deputy Assistant Secretary of Defense

Enclosure

APPENDIX D

DoD FY75 ANNUAL VALUE ENGINEERING STATISTICS

	Army	Navy	Air Force	DSA	Total
In-house Savings*					
Prior to Production	$42.1M	$24.6M	$6M	0	$72.7M
During Production	76.2M	47.6M	176M	$46.3M	346.1M
Total	$118.3M	$72.2M	$182M	$46.3M	$418.8M
VECP Savings**					
Prior to Production	$ 4.6M	0	$11.1M	0	$15.7M
During Production	12.2M	$4.6M	7.3M	$1.6M	25.7M
Total:	$16.8M	$4.6M	$18.4M	$1.6M	$41.4M
Training					
VE Methods	394	134	179	48	755
Contract Clauses	46	0	120	0	176
Indoctrination	489	25	1216	314	2044

*One-year effect

** During contract sharing period

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Enclosure

APPENDIX D

TYPICAL ACTIONS TO BE TAKEN BY ARMY ACTIVITIES TO INCREASE CONTRACTOR VALUE ENGINEERING CHANGE PROPOSAL SAVINGS

1. Encourage contractor submission of Value Engineering (VE) Change Proposals pursuant to VE contract clauses through direct personal contacts with top management, program managers, engineers and technical personnel of Army contractors.

2. Increase VE training and indoctrination of Army personnel such as a one day VE contract course. The Air Force Institute of Technology - School of Systems and Logistics has developed a one day on-site VE training course on the new VE ASPR clauses. The course is designed for procurement personnel. Additional details and course availability can be obtained by contacting Mr. Howard Pryor, Wright-Patterson AFB, Ohio 45433, AUTOVON 787-7714.

3. Review in detail all over-age VECPs to assure that adequate progress is being made to improve processing time.

4. Co-sponsor with DCAS and the Society of American Value Engineers Government/Industry Seminars.

5. Emphasize greater subcontractor participation in VE activity.

6. Continuation of annual VE workshops for Government owned Contractor operated facility contractors.

7. Intensify reviews of reasons for rejection of VECPs to assure that decisions are based on sound technical evaluation.

8. Request personal attention of commanders toward increasing VECP savings.

9. Increase goals for number of VECPs submitted by contractors.

10. Identify and visit non-performing contractors.

11. Forward letters to contractors to explain and promote VE.

12. Improve VECP processing time.

13. Publicize successful contractor VECPs in various Defense news media.

APPENDIX E

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF
FOR [illegible] AND ACQUISITION
WASHINGTON, D.C. 20310

REPLY TO ATTENTION OF: DAMA-PPP-C

2 March 1976

MEMORANDUM FOR: MR. STANLEY N. NISSEL, DEPUTY GENERAL COUNSEL (LOGISTICS)

SUBJECT: Funding for Value Engineering Efforts

1. References:

a. DoDD 5010.8, subject: Department of Defense Value Engineering, February 2, 1972. (Tab A)

b. DoDI 7110.2, subject: Budget Guidance for Value Engineering, April 3, 1972. (Tab B)

c. Extract of revised AR 5-4 revision Chapter 5 Value Engineering. (Tab C)

d. Extract of ASPR Part 17 - Value Engineering. (Tab D)

e. HQ USAMC letter, file AMCRD-ES, subject: Value Engineering (VE) Funding, 22 January 1975. (Tab E)

f. OSD Memorandum For Assistant Secretaries of the Military Departments (R&D) and (I&L), subject: Value Engineering, 1 May 1975. (Tab F)

g. HQ USAMC letter, AMCRD to the COA, 16 May 1975. (Tab G)

h. DACA-OMP Memorandum For: Office of Management Practices, subject: Value Engineering (VE) Funding, 29 May 1975. (Tab H)

i. DACA-OMO letter to Commander, HQ USAMC, subject: Funding Value Engineering Projects, 21 November 1975. (Tab I)

j. OASD(I&L) Memorandum For: LTG John A. Kjellstrom COA subject: Value Engineering Program Review, 12 December 1975. (Tab J)

k. OASA Memorandum For: Comptroller of the Army, subject: Value Engineering Program Review 2 January 1976. (Tab K)

l. COA Memorandum For: LTG H. H. Cooksey, DCSRDA, subject: Funding of Value Engineering Projects, 7 January 1976. (Tab L)

m. DoDI 7040.5, subject: Definitions of Expenses and Investment Costs, 29 March 1968.

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APPENDIX E

DAMA-PPP-C
SUBJECT: Funding for Value Engineering Efforts

2. This office has been requested by the ASA(RD) and COA to establish a dedicated budget line item in each of the five Procurement Appropriation and the RDT&E Appropriation to fund for Value Engineering (VE) Projects (see Tabs K and L). The COA has requested that ODCSRDA establish procedures for VE projects similar to the Quick Return on Investment Program (funded as the Capital Investment Opportunities Program in the Procurement Appropriations). I agree with the proposal.

3. Under current procedures, VE efforts related to specific procurement line items or R&D projects are considered as legitimate costs of the it or projects. Contractual costs are covered in the ASPR (Tab D). Govern ment VE efforts related to specific procurement line items whether performed at AIF or non-AIF installations are reimbursed to the applicable appropriations by the Procurement Appropriations and are budgeted for a part of the total cost of the specific budget line items. Under the RD appropriation, VE costs associated with specific R&D projects are funde in the overall project costs.

4. The COA request for specific funding of VE Projects would primarily cover those VE efforts related to Procurement and RDT&E efforts which cannot be identified to specific line items or projects. VE efforts of this type are direct personnel or personnel related costs. In accordance with reference m and DoD budget guidance, direct personnel costs cannot be charged to Procurement Appropriations (labor costs are expenses except when incurred in production of investment items). There is no such restriction in RDT&E, since direct personnel costs are budgeted for in that appropriation.

5. Request your opinion of the legality of establishing a dedicated line item in each of the five Procurement Appropriations for VE efforts prior to action by ODCSRDA to request OSD authority to establish budget line items for VE.

FOR THE DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT, AND ACQUISITIO

12 Incls
as

ERNEST D. PELLOTTO
Brigadier General, US
Director of Materiel
Plans and Programs

BEST AVAILABLE COPY

APPENDIX F

DEPARTMENT OF THE ARMY Development & Readiness Co...
HEADQUARTERS UNITED STATES ARMY MATERIEL COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22333

APP F

DRCDE-E

2 March 1976

SUBJECT: Value Engineering

HQDA (DACA-MP)
WASH, DC 20310

1. References:

a. Letter, DACA-MP, 14 Jan 76, subject as above.

b. Letter, AMCRD-ES, 22 Jan 75, subject: Value Engineering (VE) Funding.

2. I share your concern for the high acquisition cost of Army materiel and feel our efforts have satisfied many of the areas discussed in reference 1a. The inclosure addresses each recommended typical action, areas where we have made progress and areas which still require effort on our part.

3. Funding for VE projects is of extreme importance and continues to be our major problem. I indorse Mr. Gansler's comments on the need for funding VE investments. Although DARCOM activities have been instructed to include sufficient funds in the budget levels to provide for high priority VE investments, the budget guidance does not provide adequate VE funding procedures to assure a timely response in support of VE projects which must be initiated promptly to realize the potential savings.

4. I strongly recommend your favorable consideration of our 22 Jan 75 recommendation (reference 1b) for the establishment of dedicated VE accounts as a major step toward solving the VE problem and significantly increasing the cost savings of Army materiel.

1 Incl

GEORGE SAMMET, JR.
Lieutenant General, USA
Deputy Commanding General
for Materiel Development

APPENDIX G

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

1 MAY 1975

MEMORANDUM FOR Assistant Secretaries of the Military Departments (R&D)
Assistant Secretaries of the Military Departments (I&L)

SUBJECT: Value Engineering

There has been growing management recognition in both DoD and industry in the last several years of the need for redirecting and revitalizing our Value Engineering Program. Specifically, it should be utilized to support our Design to Cost objectives and help restrain cost growth after initiation of production. The OSD has initiated a number of actions in the past year to improve and restructure the DoD VE Program to capitalize on this opportunity (see enclosure). We plan to continue to improve this program wherever it serves overall DoD objectives.

A major purpose of this memorandum is to expand the use of the principles of VE during development. Historically, most VE has been practiced during the production and support phase since performance was the primary development concern. However, as documented in the draft Cost Engineering Group Report on Value Engineering in Design and Development, there are numerous examples of successful use of VE principles during design.

Clearly, the use of VE principles in design and development should be integrated to the maximum degree possible as a responsibility of line DoD engineering personnel to minimize any additional VE staffing required. This means increasing the amount of training in VE methodology for such personnel. The Army Management Engineering Training Agency (AMETA) is currently updating this course to include Design to Cost considerations.

Despite the application of VE principles as "part of the job", some developments will obviously still go over production cost target. A Service capability to conduct VE "mixed skill" studies in such cases would provide another option on what to do about the problem. While the OSD has provided such service in the past (with our PESO group), there has been increasing demand by the Services for such support. Rather than increase the size of our OSD group, perhaps such a capability is desirable in each of the Departments (we believe it would be).

We also need to improve our use of VE contract incentives, especially in production. We currently save about $60 million a year on VECPs against a potential of at least a quarter billion dollars. (This is the submitted level of savings. I believe if we funded more VE submissions we would get even more suggestions.) Performance varies drastically between Services and Program Offices, ranging from zero to individual program savings in excess of $25 million. The VE incentive clause is a readily usable means of motivating contractors to attack costly, but unnecessary, specifications and contract requirements. It is one of our most ready means of offsetting cost growth during production. It has also been used in a number of full-scale development programs to reduce software costs in data and testing.

Converting these opportunities into realities requires top management support and follow-up. This includes allocation of funds as VE money. Without this "seed" money, the Program Office cannot invest in order to make future savings. Obviously, cost reduction does not come naturally. Your support in improving the productivity of the VE Program is necessary. The Deputy Assistant Secretary of Defense (Materiel Acquisition) will review progress in the VE Program annually in the future.

[SIGNED]

MALCOLM R. CURRIE
Director
Defense Research & Engineering

[SIGNED]

DR. JOHN J. BENNETT
Acting Assistant Secretary of Defense
(Installations & Logistics)

cc:
DCA
DSA
NSA

Enclosure

APPENDIX G

ACTIONS TO REORIENT VALUE ENGINEERING IN THE DOD

1) VE ASPR provisions have been completely revised to improve ease of use and administration, to make sharing more equitable, and to answer complaints of both industry and the Military Departments.

2) Reporting has been simplified and reoriented to reflect areas where current emphasis is desired.

3) The Services have been requested to review VE funding practices to reduce savings opportunities lost when investment funds are not available in one account (or one year) to finance VE actions which would have benefits to other accounts (or future years).

4) A survey of the use of VE in support of Design to Cost by industry has been completed. A draft report, Value Engineering in Design and Development, identifying areas how VE can be helpful to the DoD in design to cost has been completed and distributed.

Enclosure

APPENDIX H

DEPARTMENT OF THE ARMY
OFFICE OF THE COMPTROLLER OF THE ARMY
WASHINGTON, D.C. 20310

DACA-MP

SUBJECT: Value Engineering

LTG George Sammet, Jr.
Deputy Commanding General
for Materiel Development
US Army Materiel Development and Readiness Command
5001 Eisenhower Avenue
Alexandria, Virginia 22333

Dear General Sammet:

Reference your letter, DRCDE-E, HQ DARCOM, 2 March 1976, subject as above.

I agree with your recommendation for the establishment of dedicated accounts to finance Value Engineering (VE). On 7 January 1976, I forwarded a memorandum to the Deputy Chief of Staff for Research, Development and Acquisition (DCSRDA) (Incl 1) requesting that VE funding procedures be established similar to those in existence for the Quick Return on Investment Program (QRIP). I recommended that a line item be established in each benefiting appropriation to finance VE proposals on a two-year payback period.

On 2 March 1976, ODCSRDA requested the Deputy General Counsel (Logistics) to provide an opinion concerning the legality of establishing a dedicated line item in each of the five Procurement Appropriations for VE efforts.

In addition to recommending establishment of QRIP-type procedures for VE, guidance has been included in FY 76 Program Budget Guidance forwarded to MACOMs in January 1976. Also, the FY 78-82 POM contains $1.9 million in OMA which will be available for financing high priority DARCOM requirements. FY 78 VE requirements should be fully explored and priorities established for funding in the Command Operating Budget Estimate. These actions on your part in FY 77-78 should facilitate an equitable level of funding for VE.

APPENDIX H

DACA-MP
SUBJECT: Value Engineering

I appreciate your interest in the Value Engineering Program and will keep you informed on the results achieved in establishing dedicated VE accounts.

1 Incl
as

Joseph H. Sherick
Acting Comptroller of the Army

APPENDIX I

OFFICE OF THE COMPTROLLER OF THE ARMY
WASHINGTON, D.C. 20310

I

CH/MP

XO

DACA-MP

7 JAN 1976

MEMORANDUM FOR: LTG Howard H. COOKSEY, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT AND ACQUISITION

SUBJECT: Funding of Value Engineering Projects

1. There has been considerable high level interest in recent months on reducing government costs through increased productivity. One of the principal methods of enhancing productivity has been achieved through the utilization of Value Engineering (VE).

2. At the request of Mr. Jacques Gansler, Deputy Assistant Secretary of Defense (Materiel Acquisition), representatives of OCA briefed him on the Army VE Program, which has achieved marked success in VE savings over the past several years, even though operating within limited funding parameters.

3. In order to realize the full savings potential of VE, Mr. Gansler, in his 12 December 1975 memorandum (Incl 1) to the COA, stated his view that specific funds should be set aside for VE investment. Subsequently, the ASA(FM), Mr. Hadlai Hull also reiterated this same viewpoint in his 2 January 1976 memorandum (Incl 2) to the COA.

4. I strongly indorse the need for a vigorous VE Program which has continuously demonstrated its effectiveness in achieving significant savings. It is good prudent management to fund such VE Projects.

5. Accordingly, I am requesting that procedures similar to those established for the Quick Return on Investment Program (QRIP) be developed to fund VE Projects. Since we have experienced such notable success with the QRIP funding, I would suggest for VE similarly establishing a line item in each benefiting appropriation to finance VE proposals on a two year payback period.

6. I believe this proposal is a realistic approach that will benefit the Army and I would appreciate your views on the subject.

2 Incl
as

J. A. KJELLSTROM
Lieutenant General, USA
Comptroller of the Army

DACA-MP Record Copy

COST SAVINGS FROM CLEANUP CHANGES

CLEANUP CHANGE vs FORMAL ECP (AVG) = $7,000Δ

TOTAL PROGRAM SAVINGS ≈ $8,000,000

	ECP	CLEANUP CHANGE
AVERAGE PAGES	23	3
COST DATA REQUIRED	YES	YES *
FACT FINDING	YES	NO
COST NEGOTIATION	YES	NO
USAF AUTHORIZATION	7 MO.	7 WEEKS

*Rough Estimate Only

ESTIMATED VALUE OF CHANGES..... ±$13,000,000

VALUE ENGINEERING CHANGE PROPOSAL (VECP)

- A COST REDUCTION PROPOSAL DEVELOPED BY MCAIR AND SUPPLIERS (CHANGES TO DRAWINGS, DESIGN, SPECIFICATIONS OR OTHER CONTRACT REQUIREMENTS)
- THE VECP INCLUDES:
  - A. DESCRIPTION OF CHANGE AND SUBSTANTIATION
  - B. EFFECTS ON RELIABILITY, MAINTAINABILITY, PERFORMANCE AND OTHER FACTORS
  - C. COST DATA, INCLUDING IMPLEMENTATION AND LIFE CYCLE COST
- NO CHANGE TO TARGET COST, TARGET PROFIT OR CEILING PRICE
- NO NEGOTIATION OR FACT FINDING REQUIRED

90% SAVINGS TO USAF

IMPLEMENTATION

- EXPERIENCED, CAPABLE, DEDICATED TEAM
- GOOD ORGANIZATION AND MANAGEMENT SYSTEMS
- HELPFUL CONTRACT FEATURES

FOR EXAMPLE: PROVISIONS FOR –

- *CLEANUP CHANGES*
- *VALUE ENGINEERING CHANGES*

CLEANUP CHANGE

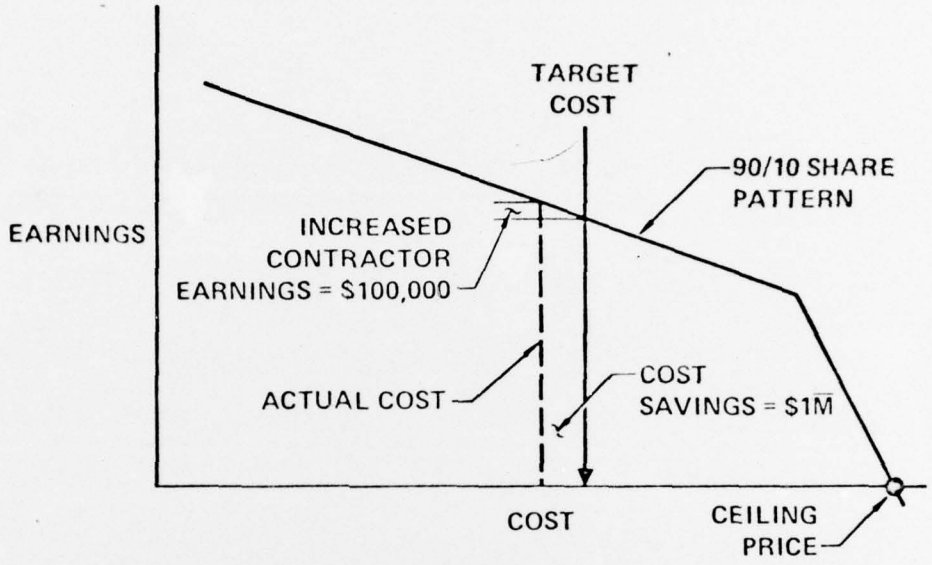
DEFINITION:

A LETTER CHANGE WHICH AUTHORIZES EDITORIAL CORRECTIONS OR CHANGES TO SPECIFICATIONS, PROGRAM PLANS, MIL-STD REQUIREMENTS OR HARDWARE DESIGN IF COST CHANGE IS BELOW $100,000.00 (PLUS OR MINUS)

NO ADJUSTMENT IN CONTRACT TARGET COST, OPTION COST, OR SCHEDULES

APPROXIMATELY 1175 CLEANUP CHANGES TO DATE

F-15 VECP COST/EARNINGS SHARING



USAF SAVINGS = $1,000,000 – $100,000 = $900,000

VALUE ENGINEERING CHANGE AFFECTING DESIGN/HARDWARE

TITLE:

REPLACEMENT OF THE GUN GAS PURGE SYSTEM WITH A GUN GAS VENTILATION SYSTEM (VECP NO. 174)

DESCRIPTION:

FLIGHT TEST RESULTS INDICATED THAT THE RAM AIR PURGE SYSTEM WAS NOT REQUIRED. THIS ELIMINATED DUCTS, FLEX HOSE, VALVES, ACTUATORS, CONTROLLABLE AIR SCOOP, LINES AND WIRING

COST SAVINGS $1,500,000

VALUE ENGINEERING CHANGE AFFECTING DESIGN/HARDWARE

TITLE:

REDESIGN OF COMMUNICATIONS, NAVIGATIONS AND IDENTIFICATION CONTROL PANELS (VECP NO. 56)

DESCRIPTION:

THE INTEGRATED COMMUNICATIONS, NAVIGATION, AND IDENTIFICATION CONTROL (CNI) PANELS SPECIFICATION IDENTIFIES FOUR MAJOR COMPONENTS OF THE SYSTEM: THREE INDIVIDUAL CNI PANELS AND A STATUS DISPLAY PANEL. THIS VECP ADVOCATED REDESIGN OF THE CNI CONTROL PANELS TO REDUCE COST AND WEIGHT OF THE F-15 AND TO IMPROVE FLIGHT SAFETY BY RELOCATING THE MOST FREQUENTLY USED DISPLAYS AND CONTROL IN THE VICINITY OF THE HEAD-UP DISPLAY

COST SAVINGS $1,662,482

VALUE ENGINEERING CHANGE AFFECTING PROGRAM PLAN

TITLE:

ELIMINATION OF TF-15 PERFORMANCE DEMONSTRATION FLIGHT TEST PROGRAM (VECP NO. 48)

DESCRIPTION:

CONTRACTUAL COMMITMENTS FOR THE TF-15 PERFORMANCE VALIDATION WOULD REQUIRE 27 FLIGHTS OVER A THREE-MONTH PERIOD TO PROVIDE QUALIFICATION FOR TF-15 FLIGHT PERFORMANCE. MCAIR PROPOSED THAT TF-15 PERFORMANCE BE ASSESSED BY ANALYSIS OF F-15 FLIGHT QUALIFICATION DATA TOGETHER WITH WIND TUNNEL TESTING OF BOTH THE F-15 AND TF-15. THIS APPROACH WAS HIGHLY REPRESENTATIVE BECAUSE OF THE SMALL AERODYNAMIC DIFFERENCE BETWEEN THE F-15 AND THE TF-15. IN ADDITION TO ELIMINATING THE 27 FLIGHTS OF THE TF-15 PERFORMANCE QUALIFICATION, IT CANCELED TWO OF FIVE REQUIRED ENGINE CALIBRATIONS AND REDUCED SPARES DEMAND AND CORRESPONDING COST.

COST SAVINGS $1,347,000

VALUE ENGINEERING CHANGE AFFECTING DESIGN/HARDWARE

TITLE:

F-15 RADAR SET, DIGITAL RADAR TARGET DATA PROCESSOR, DESIGN CHANGE (VECP NO. 229)

DESCRIPTION:

THIS VECP SIMPLIFIED THE RADAR SET DESIGN BY COMBINING THE LOW PULSE REPETITION FREQUENCY (LPRF) DIGITAL AND LPRF ANALOG MODULES IN THE RADAR TARGET DATA PROCESSOR (RTDP) INTO A SINGLE MODULE. THIS WAS ACCOMPLISHED BY HYBRIDIZING CIRCUITS ON THE PRESENT LPRF ANALOG MODULE, WHICH RESULTED IN A REDUCTION IN THE QUANTITY OF COMPONENTS AND CIRCUITRY REQUIRING UTILIZATION OF ONLY HALF A MODULE. THIS ENABLED CIRCUITRY FOR THE LPRF DIGITAL MODULE TO BE TRANSFERRED TO THE SECOND HALF OF THE NEW ANALOG MODULE. COMBINING THESE MODULES SIGNIFICANTLY REDUCED ASSEMBLY AND TEST TIME ASSOCIATED WITH THE SUBFUNCTION OF GENERATING X, Y, AND Z DEFLECTION VOLTAGES FOR LPRF MODES. THE TWO REPLACED MODULES WERE SPARED IN LESSER QUANTITY WHILE THE NEW MODULE BECAME THE PRIMARY SPARE; TEST WAS AFFECTED BECAUSE THE PROCEDURES FOR FAULT ISOLATION TO A MODULE CHANGED. THE OLD AND NEW RADAR TARGET DATA PROCESSOR REMAINED INTERCHANGEABLE IN THE AIRCRAFT.

COST SAVINGS $1,552,000

F-15 PROGRAM
SUMMARY OF VECP SAVINGS
01 DECEMBER 1975

	QUANTITY	VALUE
A. SUBMITTED TO USAF	139	$153,042,911
B. DISAPPROVED	33	26,565,281
C. APPROVED BY USAF	106	126,477,630
D. IN PROCESS	10	16,672,885
E. TOTAL POTENTIAL (C + D) SAVINGS	116	$143,150,515

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10. Design to Cost - 1976 Conference, First Series.

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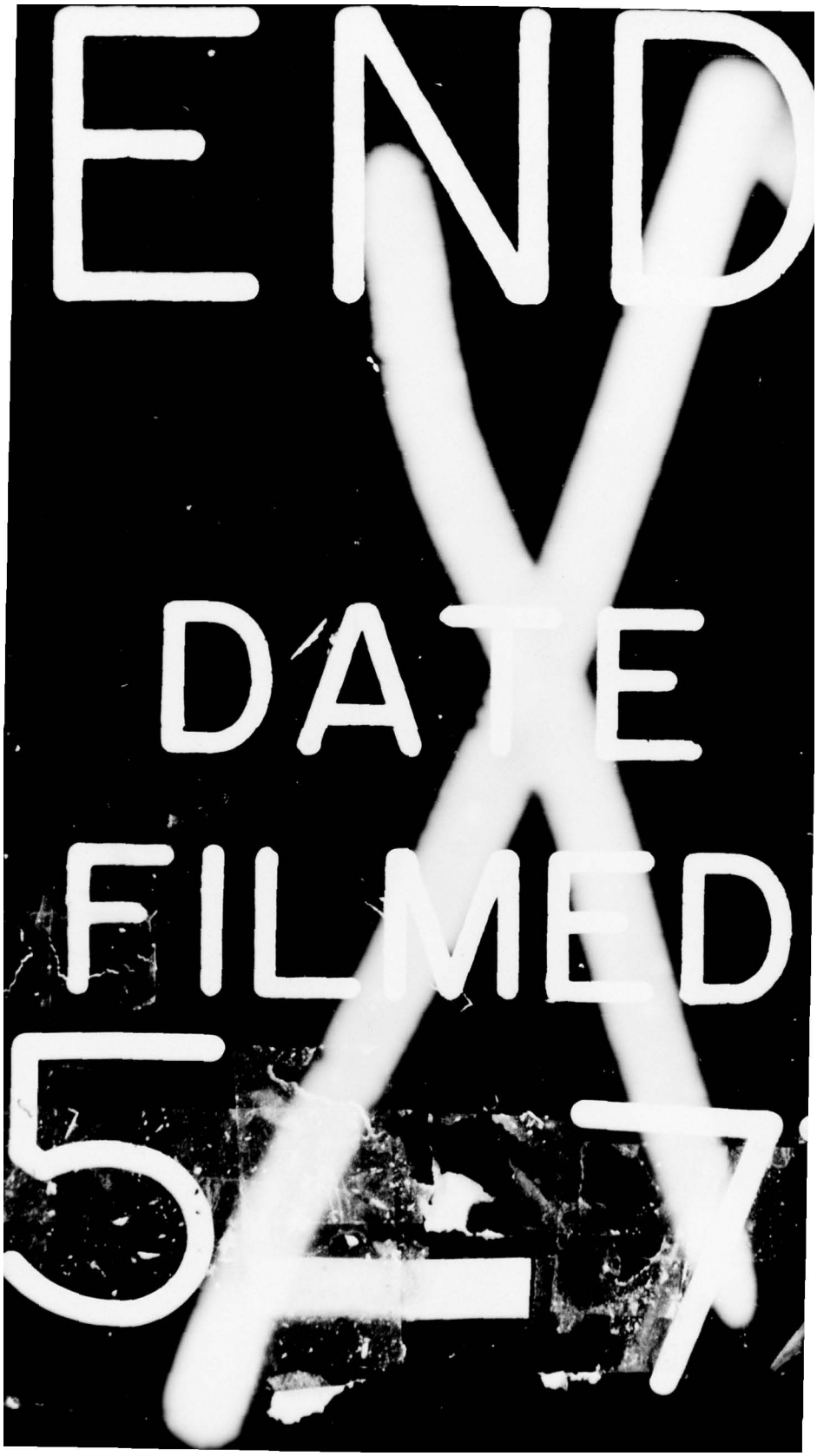
12. Value Engineering Handbook, Pamphlet 5-4-5, Oct 1974, pp 3-25.

13. Telephone Interviews with: H. Mldezenick, Manufacturing and Technical Division, DARCOM (274-4809); Mr J. Romine, AFSC, Andrews Air Force Base (185-2061); Mr C. Wiant, Naval Materiel Command (692-3011).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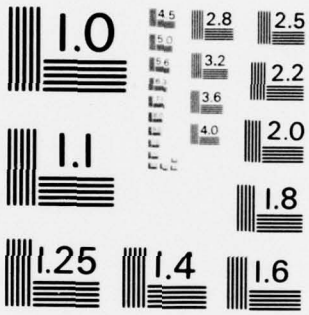
AD-A038 671 VALUE ENGINEERING IN THE DOD ACQUISITION PROCESS(U) 2/2
DEFENSE SYSTEMS MANAGEMENT COLL FORT BELVOIR VA
M GLUCK NOV 76

UNCLASSIFIED F/G 14/1 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963 - A

SUPPLEMENTARY

INFORMATION

Errata

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DTIC-DDAC
30 Aug 84