DEFENSE INDUSTRY VALUE ENGINEERING PROGRAM REVIEW

Logistics Management Institute
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SUMMARY

LMI recently completed Task 67-16, Defense Industry Value Engineering Program Review.

As a result of this review, LMI believes that significant opportunities exist for increasing defense industry participation and effectiveness in the DoD Value Engineering Program through stimulating a much greater exploitation of the "savings sharing" potential of industry-initiated Value Engineering Change Proposals (VECPs).

We conclude that defense industry will probably increase its VECP activity significantly:

- When it is generally convinced that its DoD "customer" is receptive to industry-initiated VECPs.
- When DoD VECP processing time is reduced and the quality and quantity of VECP "feedback" information are improved.
- If the DoD closely monitors experience and problems under the current VE Armed Services Procurement Regulation provisions and makes timely corrections as necessary to maintain strong industry motivation.
- If all concerned DoD and defense industry personnel have a thorough understanding of the intent, objectives and procedures of the DoD VECP Program.

In order to realize the full "savings sharing" potential of the DoD VECP Program, LMI recommends that:

1. The DoD further intensify and continue its educational, training, and promotional efforts on the DoD VECP Program until a thorough understanding of that program's intent, objectives and procedures is ingrained in concerned personnel at all levels of the DoD and defense industry.

2. The DoD continue and intensify its efforts to improve the operations of its systems for configuration control and make an immediate, special effort to improve the DoD processing of industry VECPs.

3. The DoD closely monitor experience and problems under the current VE ASPR provisions (Revision No. 23) and make timely corrective revisions as necessary to maintain strong motivation for industry VECP activity.

4. Defense industry management also intensify its educational, training, and promotional efforts on the DoD VECP Program to insure that the program's intent, objectives and procedures are thoroughly understood by concerned personnel at all levels of defense industry.

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II. INTRODUCTION

A. PURPOSE AND SCOPE OF THE REPORT

This report attempts to answer for the Department of Defense the question whether significant opportunities exist for increasing defense industry participation and effectiveness in the DoD Value Engineering Program. The answer is affirmative. The most significant potential for such increased participation is in the area of contractor-initiated Class I Value Engineering Change Proposals. Accordingly, we placed major emphasis on this area during our review, and we recommend DoD and defense industry actions designed to exploit that potential.

B. BACKGROUND

1. DoD Definition of Value Engineering (VE)

"Value Engineering" is defined by the DoD as "... an organized effort directed at analyzing the function of DoD systems, equipment, facilities, procedures, and supplies for the purpose of achieving the required function at the lowest total cost of effective ownership, consistent with requirements for performance, reliability, quality and maintainability."[1]

2. The DoD Value Engineering Program

Recognizing VE as "... an effective management instrument for cost reduction ...", the DoD established the "Department of Defense Value Engineering Program" with the mandate that "Value engineering techniques shall be fully utilized by

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[1] DoD Pamphlet, "Reduce Costs and Improve Equipment Through Value Engineering," January 1967.

DoD contractors and activities wherever they can profitably be employed ...".[1]

3. Defense Industry

The DoD has defined a "contractor" as "... an organization with whom the Government contracts for the furnishing of supplies and services."[2] For the purposes of this report, we defined "defense industry" as those contractors (business firms and educational and non-profit institutions) who receive such contracts from the DoD.

The increase in military activity in Southeast Asia brought about a sharp upswing in military procurement from the FY 1965 figure of $38.0 billion. In the year ending June 30, 1966 (the DoD Fiscal Year 1966), the DoD awarded $38.2 billion in military prime contracts. In FY 1967, the DoD awarded $44.6 billion in prime contracts, establishing a new high since the peak Korean war year of FY 1952.[3] Defense industry received over 90% of these contract awards.

4. Extent of Defense Industry Participation

The purpose of the LMI task was "... to determine whether significant opportunities exist for increasing defense industry participation and effectiveness in the DoD Value

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[1] DoD Instruction 5010.8, "Department of Defense Value Engineering Program," August 6, 1963, with Change 1 of June 16, 1964.

[2] DoD Instruction 7720.12, "Defense Contractor Cost Reduction Program," January 18, 1965.

[3] DoD Pamphlet, "Military Prime Contract Awards--July 1966 - June 1967," October 10, 1967.

Engineering Program." Exhibit 1 is a copy of the Task Order. Our first concern was to determine how the extent of defense industry's participation and effectiveness should or could be measured.

Since VE is a management tool for cost reduction, the best measure of defense industry's participation and effectiveness in the DoD VE Program probably would be the total dollar benefits to the DoD from defense industry's VE efforts since the expansion of the DoD VE Program in 1963--or from its inception sometime before that. Unfortunately, many of these benefits have not been or cannot be measured with precision.

We recognize that successful application of the VE discipline by defense industry on any of its business may benefit the DoD. VE actions by defense industry which reduce costs on its commercial business may ultimately benefit the DoD in the form of lower bids on later Defense business. But these dollar benefits to the DoD are not measured.

The VE actions which industry takes on its Defense business are commonly defined as:

- "Class I Value Engineering Change Proposals"

  These are Value Engineering Change Proposals (VECPs) which involve "... some change in the contract specifications, purchase description, or statement of work; this may include the elimination or modification of any requirements found to be in excess of actual needs ... and consequent reduction in the contract cost."[1]

[1] ASPR, Sec. 1-1702.1(a).

Accepted Class I VECPs reduce overall costs to the DoD, always require approval by the DoD, and always require a change to the contract. (Class I VECPs are referred to hereafter in this report simply as "VECPs".)

- "Class II Value Engineering Changes"

  These are all contractor VE actions which do not fall within the above definition of VECPs. Accepted Class II VE changes reduce overall costs (to the contractor, to the DoD, or to both), may or may not require approval by the DoD, and do not require a change to the contract.

Many of the benefits to the DoD from contractor-initiated VE actions on Defense contracts are not or cannot be measured. For example:

- Class II VE changes by defense industry on its firm-fixed-price (FFP) business with Defense ($22.1 billion awarded in FFP contracts by DoD in FY 1967) provide immediate benefits to the contractors but ultimate benefits to the DoD in the form of lower bids on future contracts because of reduced industry costs. These benefits to the DoD are not measured and reported to the DoD.
- The DoD continues to benefit today from industry-initiated VE actions first implemented several years ago but still being applied on current Defense contracts. These benefits, although substantial, are now neither measured nor reported.

It is clear, therefore, that the total benefits to the DoD from defense industry's VE efforts cannot be measured accurately and that savings which are reported represent an understatement of total benefits.

Three reporting systems do exist, however, which provide some insight into the extent of defense industry participation from the DoD standpoint.

a. The DoD Cost Reduction Program Reporting System

In May of 1963, LMI advised the DoD: "A general analysis of the present state-of-the-art of value engineering in the DoD-industry complex reveals that despite its many shortcomings, VE is currently producing annual savings of approximately $60 million. This level of savings generation is clearly far below the total potential obtainable through the full-scale use of the technique. LMI estimates that the total potential of value engineering is at least $300 million in annual savings and may possibly run $500 million or more."[1]

VE has become a mainstay in the DoD Cost Reduction Program. The DoD Cost Reduction Program is now in its seventh year of operation and has become a permanent DoD program.[2] It operates under a formalized reporting system.[3]

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[1] LMI document, "Final Report--Value Engineering," LMI Project 2A-2, May 8, 1963. Defense Documentation Center No. AD-659511.

[2] DoD Directive 5010.6, "Department of Defense Cost Reduction Program," February 15, 1967.

[3] DoD Instruction 7720.6, "Department of Defense Cost Reduction Program--Reporting System," May 19, 1967, with Change 1 of August 7, 1967.

Total savings of over $15 billion have been reported during the last six fiscal years. The VE area has contributed over $1 billion to this total.[1]

DoD Cost Reduction Program

	Savings in Millions	
Fiscal Year	VE Area	Total Program
1962	$ 64	$ 750
1963	72	1,386
1964	76	2,831
1965	204	4,843
1966	324	4,463
Total Five Year Program	$ 740	$14,273
1967	339	1,052
Total 1962 - 1967	$1,079	$15,325

These VE savings represent benefits to the DoD from VE actions by both the DoD and by defense industry. The savings have not been broken down to show DoD-initiated versus defense industry-initiated actions.

Under the first phase of the DoD Cost Reduction Program--the "Five Year Program" (FYs 1962 - 1966)--reporting ground rules permitted reporting savings in each fiscal year from the application of VE actions implemented since the program's "Base Year" of FY 1961.

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[1] Savings data extracted from OSD Year End DoD Cost Reduction Program Status Reports of July 5, 1962; October 17, 1963; October 22, 1964; September 28, 1965; October 10, 1966 and October 11, 1967.

Under the permanent DoD Cost Reduction Program--effective for FY 1967 and later years--reporting ground rules were changed to permit reporting savings in a fiscal year from the application of only those VE actions which had been first taken since the beginning of that fiscal year. The benefits from the action are reported only once--in the current fiscal year--and then the benefits from the action are dropped from the reporting system. These ground rules are more restrictive than those of the Five Year Program and provide a healthy emphasis upon current, new VE actions.

Since the ground rules of the permanent DoD Cost Reduction Program are more restrictive than those of the Five Year Program, the $339 million in savings reported in the VE area in FY 1967 is all the more impressive.

VE area savings reported during the Five Year Program grew from $64 million in FY 1962 to $324 million in FY 1966.

Thus, it appears that the LMI estimated potential of $300 million in annual savings in the VE area of the DoD Cost Reduction Program was achieved, under the reporting ground rules effective through FY 1967.

As already noted, the VE savings reported through FY 1967 represent benefits to the DoD from DoD-initiated VE actions, as well as benefits from defense industry-initiated VE actions. Benefits to the DoD from defense industry-initiated actions included savings from both VECPs and Class II VE changes.

Effective with FY 1968 reporting, however, benefits to the DoD from defense industry-initiated Class II VE changes are reportable in the DoD Cost Reduction Program only

if they result directly from a contractor VE program on a specific contract which was funded as a separate line item in the contract.[1] Thus, to be reportable, the Class II VE action must result directly from a VE "program requirement" clause which obligates the contractor to engage in VE of the scope and at the level of effort required by the Government as an item of work in the contract schedule. Since the DoD funds and monitors progress on these required VE programs, benefits to the DoD from contractor-initiated Class II VE changes resulting therefrom are still considered properly reportable in the DoD Cost Reduction Program. Benefits to the DoD from other contractor-initiated Class II VE changes, however, are no longer reportable.

DoD Cost Reduction Program data do not indicate the ratio of savings reported in the past from contractor-initiated Class II VE changes resulting directly from required VE programs as opposed to savings reported from other contractor-initiated Class II VE changes.

However, it appears that an immediate effect of this revision of reporting ground rules is a significant decrease in the "area of opportunity" for reportable contractor-initiated Class II VE changes. For example--only $2 billion in FY 1967 DoD contract awards contained VE program requirement clauses.[2] Under FY 1968 rules, only that $2 billion would be a new "area of opportunity" for reportable savings from contractor-initiated Class II VE changes.

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[1]DoD Instruction 7720.6, "Department of Defense Cost Reduction Program--Reporting System," May 19, 1967, with Change 1 of August 7, 1967.

[2]Directorate for Statistical Services, Office of the Secretary of Defense.

It follows that there will be an increased emphasis by the DoD upon savings from contractor-initiated Class II VE changes which do result directly from required VE programs, since these are the only contractor-initiated Class II VE changes which are now reportable in the DoD Cost Reduction Program. While opportunities for savings certainly do exist in this Class II VE program requirement area, its total potential is constrained by the number and dollar value of contracts containing such clauses.

It also follows that savings reported into the DoD Cost Reduction Program from contractor-initiated VECPs become even more important than in the past, since this is now the only other "area of opportunity" for reportable contractor-initiated VE actions.

This VECP area is an extremely significant "area of opportunity." In FY 1967, for example, VE clauses providing for "savings sharing" by the DoD and defense contractors from approved contractor-initiated VECPs were included in $22.5 billion worth of Defense contract awards.[1] DoD Cost Reduction Program data do not break out FY 1967 VE savings to the DoD from contractor-initiated VECPs. However, another DoD reporting system (discussed more fully in Section I.B.4.c.) does exist, and the estimated savings to the DoD from contractor-initiated VECPs during FY 1967 were $38.5 million. Thus, the benefits to DoD in FY 1967 from such VECPs appeared to represent something less than one-fifth of one percent of the dollar value of contract awards containing VE clauses.

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[1]Directorate for Statistical Services, Office of the Secretary of Defense.

The large size of this "area of opportunity" and the small ratio of estimated savings against it to date were major factors in LMI's decision to concentrate its review upon the contractor-initiated VECP area. It was evident that the most significant potential for increasing the amount of savings reported into the DoD Cost Reduction Program from defense industry VE activity is in this VECP area.

b. The Defense Contractor Cost Reduction Program Reporting System

The second existing reporting system which provides an insight into the extent of defense industry participation in the DoD VE Program is that of the Defense Contractor Cost Reduction Program.

This program grew out of President Johnson's letter to major defense contractors in December 1963, calling upon them to intensify their efforts to reduce costs under their Defense contracts. Currently, 85 parent companies with 211 reporting divisions actively participate in the program and report semi-annually to the DoD on their cost reduction accomplishments. These companies receive about 50% of the DoD's annual prime contract dollars.

Participants report the cost reduction to the DoD that they have achieved on their other than firm-fixed-price Defense contracts. These cost reductions are savings to the DoD, since by definition they represent the elimination of costs which, had they been incurred, would have been paid for by the DoD.

In the three years of formalized reporting under this program, participants have reported savings to the DoD of over $2.7 billion.[1] A significant portion of the savings reported has been attributed to value engineering. In the last two fiscal years, $424 million in VE savings were reported.

Defense Contractor Cost Reduction Program

	Savings in Millions	
Fiscal Year	VE Area	Total Program
1966	$232	$ 996
1967	192	972
Two-Year Total	$424	$1,968

These VE savings represent over 20% of total savings reported in the Contractor Program during the last two fiscal years. The total VE savings and the high VE percentage of total savings are evidence of strong VE activity by program participants from defense industry.

Contractor Program data do not provide a breakdown of VECP as opposed to Class II VE savings. However, a third DoD reporting system (discussed next) estimates total savings to the DoD from contractor-initiated VECPs as $47.1 million in FY 1966 and $38.5 million in FY 1967. It would appear, therefore, that VECP savings could represent only about 20% of the $424 million in VE savings. It follows that contractor-initiated Class II VE changes probably account for about 80% of these VE savings.

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[1] Director for Cost Reduction and Management Improvement Programs, Office of the Secretary of Defense.

It is evident, then, that participants are reporting significant Class II VE savings in the Contractor Program while savings from VECPs are comparatively small. This was another reason why LMI decided to concentrate its review upon the contractor-initiated VECP area.

c. The DoD Contractor-Initiated VECPs Reporting System

The third DoD reporting system which provides an indicator of defense industry's participation in the DoD VE Program is one which gathers together data on contractor-initiated VECPs.[1] These VECPs are usually submitted under VE provisions incorporated in Defense contracts in accordance with Armed Services Procurement Regulation (ASPR) policy:

> "In order to realize fully the cost reduction potential of value engineering, provisions which encourage or require value engineering shall be incorporated in all contracts, including letter contracts, of sufficient size and duration to offer reasonable likelihood for cost reduction. All such provisions shall offer the contractor a share in cost reductions ensuing from change proposals he submits under such contracts."[2]

These VE provisions are of two types: (1) VE "incentive" clauses--which permit the contractor to share in

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[1] DoD Instruction 7720.10, "Contractor-originated Value Engineering Change Proposals--Reporting Requirements," September 10, 1965.

[2] ASPR, Sec. 1-1701(b).

cost reductions which ensue from VECPs he submits, and (2) VE "program requirement" clauses--which obligate the contractor to engage in VE at a defined level of effort and scope; however, these clauses also contain VE incentive features permitting sharing of savings from accepted VECPs.

There are three types of savings which are subject to such "savings sharing" between the DoD and contractors submitting acceptable VECPs:

(1) "Instant Contract Savings" - Savings realized under the contract on which the VECP was submitted;

(2) "Future Acquisition Savings" - Savings on future acquisitions of the item, components, system or task incorporating the VE change; and

(3) "Collateral Savings" - Savings resulting from a net reduction in the Government's overall projected costs (costs of operation, maintenance, logistic support, etc.), where such reduced costs result from the VECP.

The DoD Contractor-Initiated VECPs Reporting System provides the Office of the Secretary of Defense with quarterly data on contractor-initiated VECPs received, approved, disapproved or withdrawn and on hand--as well as the number on hand over 60 days. The system also reports estimated savings to the DoD from the VECPs in each category. The estimated savings to the DoD include the total DoD savings share from the VECP (Instant, Future Acquisition and Collateral). This reporting system is entirely distinct and separate from the two Cost Reduction Program reporting systems.

Estimated savings to the DoD from approved contractor-initiated VECPs reported in this system totaled $118.6 million over the last four fiscal years.[1]

DoD Contractor-Initiated VECPs Reporting System

Fiscal Year	No. of VECPs Approved	Estimated Savings to DoD (in Millions)
1964	288	$ 13.0
1965	704	20.0
1966	982	47.1
1967	802	38.5
Total 1964 - 1967		$ 118.6

The FY 1964 - 1966 upward trend in contractor-initiated VECP activity (in both approvals and estimated DoD savings) was reversed in FY 1967. We have already observed that the FY 1967 estimated DoD savings of $38.5 million represent something less than one-fifth of one percent of the $22.5 billion "area of opportunity" in FY 1967 contracts awarded with VE provisions. These figures become more significant when compared with the greater FY 1966 savings of $47.1 million against a lesser FY 1966 "area of opportunity" of $19.2 billion in awards.[2]

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[1]Directorate for Value Engineering, Office of the Secretary of Defense.

[2]Directorate for Statistical Services, Office of the Secretary of Defense.

C. STUDY METHOD

1. Interviews

The Task Order specifically called for LMI interviews with "defense industry management to review the status of the DoD /E Program in their organizations and to solicit suggestions regarding means for increasing the degree of program participation and productivity." Interviews with industry management were the primary means of conducting this review.

With an eye toward balance in the industry inputs, we did not confine our discussions to value engineering managers and personnel. In addition to such practitioners, during a typical plant visit we also held discussions with the executive in charge of the plant, engineering and program managers, contract negotiators and administrators, marketing managers, financial managers, and DoD personnel resident at the plant.

The plants which were visited were selected with the objective of getting the views of persons with DoD VE Program experience involving a broad range of typical DoD programs and contractual arrangements. It required little special effort on our part to secure a mix of comments from persons with varying degrees of optimism and pessimism regarding the potential of the contractor-initiated VECP area. Companies and plants visited appear in Exhibit 2 to this report.

Because of a natural concern about customer relations and their competitive position, many of the industry people with whom we held discussions considered the information which they supplied to LMI to be sensitive. They cooperated with LMI with the assurance that individual company views and data would be treated as confidential by LMI, with our report expressed in summary or consolidated form.

In addition to the facts and views assembled during LMI's plant visits, advice and assistance were received from the Society of American Value Engineers (SAVE) and the National AeroSpace Services Association (NASSA). Preliminary findings were reviewed with personnel of the Los Angeles Regional Office of the General Accounting Office, which was making its own review of the defense industry VE program, and with a small number of DoD officials.

2. Industry and OSD Data

The Task Order also called for an LMI analysis of industry data on the VE program. Data furnished by contractors related primarily to their specific VECP programs and experience. Three directorates of the Office of the Secretary of Defense provided us with a considerable quantity of aggregate data pertaining to prime contract awards and contractor VE activity. SAVE provided us with data resulting from a National AeroSpace Services Association VE questionnaire sent to member companies.

3. Use of Previous Study Material

In 1963 the DoD, with LMI help, made an intensive survey of value engineering in the Department of Defense and defense industry, followed by no less than eight discrete tasks aimed at developing solutions to the "many problems . . . which required solution before value engineering's inherent potential could be attained . . ." Such things as ASPR coverage; implications of the type of contract used; criteria for applying VE; selection and training of VE personnel; organization and level of VE effort; and the systems for processing VECPs were covered.[1]

[1]The various studies and action-oriented tasks are covered in the 8 May 1963 LMI document, "Final Report - Value Engineering, Project 2A-2."

The review covered by this report did not repeat the earlier, detailed, systems studies. It was a status review covering a small cross-section of defense industry, with opinions supported by specific case examples where possible. The earlier LMI VE report is referred to or quoted from at several places in this report--where a comparison of the past with the present would appear to improve the reader's perspective.

II. FINDINGS AND CONCLUSIONS

A. THE "AREA OF OPPORTUNITY" FOR DEFENSE INDUSTRY VECP ACTIVITY

The dollar value of DoD contract awards containing VECP "savings sharing" provisions rose dramatically over the last four fiscal years.[1] Estimated savings to the DoD from industry-initiated VECPs also rose dramatically from FY 1964 through FY 1966 but fell off in FY 1967.[2]

Dollars in Millions

Fiscal Year	Value of DoD Contracts with VE Provisions	Estimated Savings to DoD from Industry VECPs
1964	$10,501	$13.0
1965	13,008	20.0
1966	19,215	47.1
1967	22,508	38.5

The estimated savings figures listed above represent only the benefits to the DoD from contractor-initiated VECPs. To get total benefits before sharing, we must add to the above the industry share--estimated to be $43 for every $100 to the DoD. Industry's share in FY 1967 would be about $17 million. The total savings for FY 1967 then become $56 million on $22.5 billion in contracts--or about one-fourth of one percent of the "area of opportunity." The $22.5 billion represented over 51,000 contract actions in FY 1967; yet, there were only 802 industry-initiated VECPs approved in FY 1967.

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[1] Directorate for Statistical Services, Office of the Secretary of Defense.

[2] Directorate for Value Engineering, Office of the Secretary of Defense.

These statistics indicate a sizeable area of untapped VECP potential. This impression was strongly reinforced by our interviews with both industry and DoD personnel; almost without exception, they believe that such a potential does exist.

LMI estimates that the immediate total savings potential in this area is about two to five times that of the FY 1967 total of $56 million before sharing. Assuming a continued high level of DoD hardware acquisition and the removal of some existing impediments to the VECP effort, we believe total savings of from $100 million to $250 million annually should be attainable from the VECP area by defense industry. At current sharing experience rates, the DoD share would run between $70 million and $175 million and the industry share from $30 million to $75 million.

The eventual potential of this area may be much greater. The Deputy Assistant Secretary of Defense for Equipment Maintenance and Readiness addressed this point at the 1966 SAVE Convention:

> "Let me translate our experience to date into contract terms and indulge in a bit of projection and speculation as to the total profit pool that might be tapped by value engineering. Let us assume that VE can be successfully applied to about half of the 20-odd billion dollars the DoD spends annually with contractors or about 10 billion dollars. Now instead of 30 or 35% reductions in unit cost of items value engineered, which has been our experience in many cases, let us assume a modest 10% reduction in unit cost. That would be a potential VE cost reduction pool of about a billion dollars annually. Let us further assume average contractor sharing rates of not 50% or 75%, but only 25%. This means a minimum direct profit potential of $250,000,000 annually is apparently awaiting those entrepreneurially minded technically qualified contractors who will exploit

> the VE potential. Let us point out that this conservative $250 million in contractor sharing is equal to a 10% profit before taxes on $2.5 billion of sales."[1]

The past history and current problems of the VECP area are such that we do not foresee a $1 billion annual VECP cost reduction pool in the near future. Nevertheless, it would not seem unreasonable for the DoD and defense industry to aspire to $100 million to $250 million in annual total VECP savings.

> Conclusion A - Significant opportunities exist for increasing defense industry participation and effectiveness in the DoD Value Engineering Program through stimulating a much greater exploitation of the "savings sharing" potential of industry-initiated VECPs.

B. EXTENT OF CURRENT DEFENSE INDUSTRY VECP ACTIVITY

Many of the defense industry officials LMI contacted during this review were frank in saying that their companies are not now aggressively pursuing the DoD VECP Program, despite its admitted potential.

We have already observed that defense industry is participating effectively in the Class II VE area. Almost without exception, industry people advised that their VECP activity was currently regarded as of secondary importance to their VE efforts in the Class II area.

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[1] "A New Look at Value Engineering in the Department of Defense," page 199 of "SAVE Proceedings of the 1966 National Convention."

The VE capability of defense industry has increased significantly during the last four years, and the lack of VECP emphasis does not appear to represent a paucity of industry VE capability. For example--in 1963 LMI found that only 47 of the top 100 defense prime contractors (contract dollar basis) had VE programs and estimated that there were then only about 500 full-time value engineers employed throughout defense industry.[1] The SAVE President now estimates that virtually all of the top 100 contractors have formal VE programs, with the possible exception of some petroleum and services companies, and advises that the SAVE membership has grown from 850 in 1963 to 2,900 in 1967. (During the same period, full-time value engineers in the DoD increased from less than 200 to over 400.)

Defense industry also appears to be realizing a substantial return on this investment in VE capability. The 1963 LMI VE report stated:

> "In the opinion of LMI, the long-range determination of the proper level of effort to be applied to value engineering should be determined purely on a return on investment basis. A reasonable rate of return to be expected is generally held to be 10:1, i.e., $10 of savings are generated for every $1 spent on the value engineering program. This is not, however, a hard and fast rule."[2]

Data furnished LMI by five contractors indicated that they were realizing a return on their VE investment ranging from 6:1 to 21:1 (6, 10, 13, 17 and 21 to 1, respectively). These five contractors are realizing somewhat more than a 10:1 average return on investment.

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[1] LMI document, "Final Report--Value Engineering," LMI Project 2A-2, May 8, 1963.

[2] Ibid.

Today, defense industry is realizing the major portion of this return on its VE investment from the Class II area. Data furnished LMI by industry confirmed industry statements that its major VE effort is in the Class II area. The data showed, generally, greater Class II than VECP activity--both in numbers of actions and savings realized. In some cases, an ambitious VECP effort was begun and later scaled down or discontinued in favor of Class II activity.

We can readily understand the emphasis on Class II VE changes by industry in such areas as its firm-fixed-price business with Defense, since all savings accrue to industry from such actions and no changes to contracts are involved. Nonetheless, it appears that much of industry is not exploiting the opportunities for savings sharing where a VECP is the only method of effecting a VE change because it necessarily requires a change to the contract.

There are a few notable exceptions, however. For example, during FY 1967 there were three contractors each of whose VECP savings sharing exceeded $1 million. Two of these same contractors achieved $4.0 million and $2.7 million in savings shares, respectively, in the first quarter of FY 1968.[1]

Defense industry generally, however, is not aggressively exploiting this potential. For example, also in FY 1967, five of the largest Defense prime contractors had no significant VECP achievements--although their aggregate FY 1967 Defense contract awards exceeded $3 billion.

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[1]Directorate for Value Engineering, Office of the Secretary of Defense.

Industry officials attributed their lack of emphasis on the VECP area to what they described as:

- A non-receptive DoD "customer" attitude with respect to industry-initiated VECPs.
- Complicated and slow DoD VECP processing systems for industry-initiated VECPs.
- An unduly complex set of ASPR VE provisions.

Notwithstanding their current low level of effort on the DoD VECP Program, most of our industry contacts stated that defense industry recognizes the potential of the area and would exploit it vigorously if the DoD were to take effective corrective action in the above areas.

Conclusion B - Defense industry generally would be stimulated to a greatly increased participation in the DoD VECP Program if the major obstacles industry sees to agressive VECP activity were overcome.

C. RECEPTIVITY OF THE DoD AS A "CUSTOMER" TO INDUSTRY VECP ACTIVITY

The task order called for LMI ". . . to solicit suggestions regarding means for increasing the degree of program participation and productivity" from defense industry. The most frequent and most strongly expressed suggestion we received from industry was that the DoD should take immediate and effective steps to create a positive and receptive attitude toward industry-initiated VECPs at the "customer" level of the Defense Department.

The "customer" to whom industry refers is not top Defense Department management. Industry is well aware of the DoD top

management position on the DoD VECP Program--a position of receptivity and enthusiasm. The "customer", however, is, in fact, the Program Manager or Procurement Contracting Officer in the field and headquarters' offices of the military departments. There is a widespread belief in defense industry that this "customer" often is negatively disposed toward industry-initiated VECPs. There are also many in industry who state that if this negative attitude were transformed into a receptive attitude, the DoD would see a sudden and pronounced increase in industry VECP activity--without further stimulation.

Defense contractor personnel support their contention that a negative attitude exists in many buying and program offices by stating that some of the DoD "customers":

- Consider the DoD VECP Program to be an undesirable "give away" program which rewards industry for something it should be doing anyway.
- Interpret the DoD configuration management objectives as meaning that designs should be frozen and adopt a "no change" policy.
- Provide formal or informal "extra instructions" to contractors indicating that a low or token level of VECP activity is all that is desired.
- Put little emphasis on industry-initiated VECPs and assign them a low processing priority within their organizations.

- Accept VECPs as non-VECPs (ECPs) and thereby preclude industry sharing of savings.
- Do not pay industry "savings shares" within a reasonable time.

We found some support for each of the above allegations in the data provided LMI during our status review of a small cross-section of defense industry. Because of the limited scope of our review, we do not necessarily conclude that all or any of the six industry criticisms listed above have general validity across the total range of DoD "customers". Each appears to have had some validity in selected cases in the past, however, and that alone is cause for concern. Greater cause for concern is the apparent belief by many in defense industry that these criticisms may have widespread validity.

Industry contacts also criticized the DoD "customer" attitude in the area of contract negotiations concerning VE incentive clauses. Contractor personnel assert:

- They have often been unable to negotiate a VE clause.
- They have had particular difficulty in negotiating clauses providing for contractor sharing of future acquisition VE savings.
- The contractor sharing percentages which they are able to negotiate are often not in line with DoD policy, as expressed in the ASPR, ". . . to provide the contractor with substantial financial incentives to undertake value engineering."[1]

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[1] ASPR, Sec. 1-1703.1(b).

Data furnished LMI by the Office of the Secretary of Defense and by ten major defense contractors generally do not tend to support these assertions.

Data provided us by the Directorate for Statistical Services, OSD, showed that the dollar value of DoD contracts containing VE clauses rose from $3.3 billion in FY 1963 to $22.5 billion in FY 1967. As a percentage of total DoD procurement, contracts with VE clauses rose from 12.6% in FY 1963 to 57.3% in FY 1967.

A breakdown of the FY 1967 $22.5 billion in contracts by type of VE clause and method of savings sharing tends to indicate that contract negotiators in the DoD are including VE clauses in the major dollar portion of their contracts and are negotiating VE clauses providing not only for contractor sharing of instant contract but also future acquisition and collateral savings. The breakdown appears on Table I.

With all respect to contractor savings sharing percentages--and over-simplifying a bit--the ASPR says that on fixed-price contracts the contractor's share on the instant contract normally should be 50%; his share in future acquisition savings normally should be between 20% and 40%; and his share of collateral savings shall be 10% of the savings estimated to accrue to the Government during an average or typical year's use of the item incorporating the change. The sharing features of the contracts on which data were furnished to LMI by ten major contractors generally fit squarely within the "norms" of the ASPR.

TABLE I

FY 1967 DoD Contracts with VE Provisions

Type of VE Clause & Method of Sharing	Number of Contract Actions	Dollar Value of Contracts (in Millions)
Incentive		
Instant Contract Only	15,167	$ 4,382
Instant Contract & Collateral	13,281	5,453
Instant Contract & Future Acquisition	5,189	1,510
Instant Contract, Collateral & Future Acquisition	15,854	9,039
Total Incentive Clauses	49,491	$20,384
Program Requirement		
Instant Contract Only	1,018	$ 908
Instant Contract & Collateral	151	425
Instant Contract & Future Acquisition	74	44
Instant Contract, Collateral & Future Acquisition	388	747
Total Program Requirement Clauses	1,631	$ 2,124
Totals all VE Clauses	51,122	$22,508

For example--the contractor sharing percentage on the instant contract was 50% or greater in 67 of 93 contracts with such clauses; this represents a 50% sharing in 72% of the cases studied and indicates that 50% w[illegible]normally the percentage negotiated in those cases. Future [illegible]isition savings sharing percentages in the data we reviewed [illegible]ded to cluster between 20% and 30%; while those percentages are in the low half of the ASPR range, this sharing pattern in this one contract feature does not indicate that DoD contracting officers are ignoring DoD savings sharing policy as expressed in the ASPR. Collateral savings sharing percentages in the data we reviewed were 10% in all of the 78 contracts which contained such clauses.

We found no support for a claim that this area of VE clause contract negotiations is a general problem, although there may have been specific instances in the past where industry criticism was justified. The belief of many in defense industry that their DoD "customer" attitude is often out of step with the intent of the DoD VECP Program is, however, a general problem and may be the most serious single current impediment to more aggressive defense industry VECP activity.

Conclusion C - Defense industry will increase its VECP activity significantly when it is generally convinced that its DoD "customer--at all levels of the Defense Department--is receptive to industry-initiated VECPs.

D. DoD PROCESSING OF INDUSTRY-INITIATED VECPs

The next most frequent and strongly expressed suggestion we received from industry during our review was that the DoD should take immediate and effective steps to make the DoD VECP processing systems much more responsive and effective. Major industry criticism in the VECP processing area were:

- Too many industry VECPs are disapproved by the DoD.
- Too many industry VECPs are in the hands of the DoD for "excessively long" times before being approved or disapproved.
- Too many industry VECPs are disapproved with no reasons or with only cryptic reasons for disapproval furnished the submitting contractors; contractors are not given an opportunity to correct defective VECPs so that they can be approved.
- "Feedback" information to industry from the DoD on the status of its VECPs is generally inadequate.

Data provided to LMI during its review tended to support one or more of these criticisms in selected cases. We also found much to indicate that defense industry itself can improve the responsiveness and effectiveness of the DoD VECP processing system by improving the quality of its VECPs.

1. Extent of DoD Approval of Industry's VECPs

The percentage of DoD approval of industry VECPs (expressed as the percent approved of total approved and

disapproved/withdrawn VECPs) has ranged from 55% to 62% over the last four fiscal years.

Industry VECPs Approved by the DoD

Fiscal Year	Number Approved	Percentage Approved
1964	288	57%
1965	704	61%
1966	982	62%
1967	802	55%
1968 - 1st Quarter	231	57%

Data provided to LMI by ten major defense contractors showed a lower percentage of DoD approval on some 245 specific industry VECPs. The data covered contractor VECPs on specific programs in some cases and total contractor VECP experience in others. Analysis of data on these 245 VECPs revealed a DoD approval percentage of 45%--expressed as the percent approved of total approved and disapproved/withdrawn. Expressed as a percentage of total VECPs submitted--the percentage approved by the DoD was 35%, with 43% disapproved/withdrawn, 7% approved as non-VECPs and 15% still pending. We recognize that the data reviewed from these ten plants do not constitute a sample of total defense industry VECP activity.

LMI expresses no opinion as to what the DoD VECP approval percentage should be because of the many technical considerations which are involved in VECP decisions.

DoD analyses of reasons for rejection of industry VECPs, however, indicate that this is an area where industry itself can do much to improve the approval percentage. The Directorate for Value Engineering tallied the reasons given for rejection of samples of 90 VECPs in FY 1966 and 134 VECPs

in FY 1967. The tally showed that in a majority of the rejections, (1) the submission was not a true VECP because system performance would be adversely affected by the proposal or (2) the VECP was not supported by complete technical or cost analysis information.

Reasons Given for DoD Rejection of Industry VECPS

	Percentage of Times Cited	
Reason for Rejection	FY 1966	FY 1967
• Item or System Performance Adversely Affected	26%	36%
• Technical Supporting Information Incomplete or Inaccurate	20%	17%
• Cost Analysis Incomplete or Inaccurate	20%	4%
• Not a VECP	4%	19%
Sub-Total	70%	76%
• All Other Reasons	30%	24%
Total	100%	100%

It appears that defense industry itself can probably improve the DoD VECP acceptance rate by such means as assuring that their proposals do not adversely affect system performance and providing complete and correct technical information and cost analyses.

2. Length of DoD VECP Processing Time

The 1963 LMI Value Engineering report included a review of DoD engineering change control procedure and a finding that:

"Concerted action to speed up the processing of VE proposals through the change procedure is urgently needed.

Two broad courses should be taken:

(1) Conduct intensive studies of the total overall change situation to find solutions to the hard-core, basic problems which indirectly, and at times directly, affect VE changes. A current LMI project is directed at this end.[1]

(2) In the interim, take steps to:

- Upgrade the priority (or relative importance) of VE proposals, based on their urgency, ease of evaluation and savings potential; and
- Adapt, wherever possible, the procedural improvements typified by the "Quick Fix Cycle" . . . to other change procedures.[2] At a minimum, attempts should be made to establish specific responsibilities for required actions, to streamline flow paths, to establish and enforce time limits for actions, to allocate resources on a basis commensurate with return and to use expeditious data handling techniques.

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[1]The project referred to was LMI Task 2B, which was completed in January 1964. A DoD Directive, Instruction and other implementing documents dealing with the control of engineering and design changes and based in part on the LMI study are expected to be issued in 1968.

[2]The "Quick Fix Cycle" was a tailor-made procedure for specific application to the MINUTEMAN weapon system.

While it is admitted that the total engineering change problem is very complex and difficult and will require intensive study before solutions to it can be developed, it is believed that adoption of the preceding will lead in the interim to marked improvement in the processing of most VE proposals."

Our current study established that, whatever the DoD efforts may have been to improve the processing of VECPs through engineering change control systems, they have brought about little or no improvement in the opinion of many in defense industry.

Reports supplied to LMI during the 1963 study indicated that DoD processing time for "routine" engineering changes (virtually all VECPs were "routine") showed a range of from 1 to 720 days, with an average of 108 days.

Data on a total of 117 VECPs furnished LMI by seven contractors during the current review showed a range of from 4 to 750 days, with an average of 133 days. The average DoD processing time varied widely among these seven plants (45, 47, 65, 124, 161, 243 and 249 days, respectively). Data provided SAVE by five member companies of the National AeroSpace Services Association, in response to a VE questionnaire, indicated an average DoD VECP processing time of 88 days. We recognize that neither the LMI nor the SAVE data are representative of average DoD VECP processing time for total defense industry.

The DoD Directorate for Value Engineering states that the average elapsed time in DoD VECP processing has improved from 70 to 45 days since the inception of the VE contract incentive program in FY 1963 but notes that this "average" processing time includes cases where processing time is, in

fact, excessive. For example, first quarter FY 1968 VE Directorate data show that while 231 VECPs were approved by the DoD during that quarter, there was a backlog of 351 VECPs on hand at the end of the quarter; of these, 188 VECPs had been held over 60 days.

It appears to LMI that the defense industry criticism that too many VECPs are in the hands of the DoD for "excessively long" times before being approved or disapproved is generally valid and warrants prompt, effective corrective action by the DoD.

Here again, however, we also believe that defense industry itself can probably do much to improve DoD VECP processing time. One large industry VECP, for example, was approved by the DoD in 45 days. The contractor representative stated that the relatively quick approval was due, no doubt, to previous efforts in planning and selling and went on to say that it appears that there is much that we do not know and much to learn on both sides of the negotiation table in the field of VECPs. Industry can do its part in this area by such means as requesting the establishment of early and effective VECP communications channels and suggesting customer-company reviews during the early phases of VECP development.

3. "Feedback" of VECP Status and Disapproval Information to Industry

In its 1963 VE report, LMI noted that a significant problem area uncovered ". . . involved a few isolated cases in which valid reasons existed for disapproving a VE proposal, but were not communicated to the originator. Thus, what on the surface appeared to be cases of capricious and erroneous evaluation in reality were cases of poor communication and

Government-contractor cooperation. The conclusion to be drawn is that two-way communication and full disclosure of pertinent facts should be a standard operating procedure in all reports of the status of VE proposals in the course of their evaluation in the engineering change procedure, especially if a VE proposal ultimately must be disapproved."[1]

We found nothing in our current review which would now cause us to change the above statement of the problem or the conclusion to be drawn from it. Many industry contacts stated that their VECPs are still often being disapproved by the DoD with no reasons at all or with only cryptic reasons given for disapproval. They also complained that they are not being provided with "feedback" information upon the status of their pending VECPs. We found evidence to support these criticisms in several instances in the data furnished us by industry contacts.

Some of the industry suggestions in this area were:

- The DoD should develop and issue effective guidance to DoD personnel on the handling of industry's VECPs; industry's ability to generate VECPs may have out-distanced DoD's capability to process them properly.
- The DoD should define and spell out the respective roles of DoD resident plant representatives, procurement contracting officers,

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[1] LMI document, "Final Report--Value Engineering," LMI Project 2A-2, May 8, 1963.

program managers and Defense Contract Administration Services personnel in the handling of and providing "feedback" on industry VECPs; the priority to be given the processing of such VECPs by these personnel should also be prescribed.

- The DoD should specify a fixed period of time within which action must be taken on industry VECPs and specify the minimum content of acceptable "feedback".

These industry suggestions apply to the entire area of engineering change procedures and configuration management systems--as well as to VECPs. Publication of the DoD directive, instruction and other implementing documents on the control of engineering and design changes may clarify these points. In any event, LMI believes that the above suggestions still deserve DoD consideration. The problem of "feedback" to industry apparently is no different from what it was in 1963, and corrective DoD action still appears necessary. It goes without saying, however, that industry has a part to do here, also; defense contractors should not hesitate to request status information, complete reasons for disapprovals and any data which might enable them to cure defective VECPs.

Conclusion D - Defense industry will increase its VECP activity significantly when DoD VECP processing time is reduced and the quality and quantity of VECP "feedback" information to industry are improved.

E. THE CURRENT VE ASPR PROVISIONS

The 1963 LMI VE report pointed out one of the more serious flaws in VE as then employed in the DoD and defense industry:

> "The DoD has not been willing to put enough dollar incentives in its contracts to pay for contractors' efforts on value engineering."

One of the 1963 LMI recommendations was that the DoD:

> "Revise the Armed Services Procurement Regulation to provide direct financial incentives to defense contractors for the successful performance of value engineering. The guiding principle of the incentive provisions should be financial rewards which are based on actual results achieved, risk taken and relative return on investment."[1]

A revision of the ASPR VE provisions, then under preparation and which appeared as Defense Procurement Circular No. 11 on October 9, 1964, was cited as an improvement over the previous "weak" approach to VE in ASPR.

The 1964 revision evidently did not provide sufficient contractor motivation, and a further ASPR Revision--No. 23--was published on June 1, 1967.

Even before it was published, the 1967 revision was under fire from some industry personnel as being unduly complex, difficult to understand and containing gaps and unnecessary duplications. Although the 1967 revision is generally considered to be an improvement over the 1964 version, many in industry say: "It's not as good as we'd hoped for."

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[1] LMI document, "Final Report--Value Engineering," LMI Project 2A-2, May 8, 1963.

The most significant suggestions received from industry contacts on this subject during the current LMI review were that the DoD revise the VE ASPR provisions to:

- Simplify the language--even if no substantive-changes are to be made.
- Specify fixed, minimum contractor savings sharing percentages for all types of contracts and for all types of savings.
- Increase a contractor's savings sharing percentage after approval of two of his "Hi-dollar VECPs" (estimated savings of $50,000 or more, before sharing).
- Increase contractor collateral savings sharing percentages and lengthen the collateral savings sharing period.
- Provide for mandatory savings sharing clauses at both the prime and subcontractor level, including future acquisition and collateral savings sharing provisions for subcontractors.
- Preclude DoD use of VE savings sharing clauses as "trade-offs" during contract negotiations.
- Permit VE clause disagreements to be handled under the "disputes" clause of the contract.

During the course of the LMI review, SAVE formed an ad hoc committee which reviewed the current VE ASPR provisions and

produced (1) suggestions for a simplified version assuming no change in existing ground rules and (2) a complete, "value engineered" revision of the current ASPR VE provisions to incorporate new regulatory material which the committee considers would provide the basis for significant increases in contractor productivity and activity. Some of the industry suggestions listed above were adopted by the committee. The results of the ad hoc committee's efforts were made available to LMI. We have passed them along to the Office of the Secretary of Defense for consideration during DoD's continuing review and evaluation of the VE ASPR provisions.

LMI agrees that the VE ASPR provisions are complex. The ASPR in its entirety is a complex document, however, and we do not believe that there is a real basis for singling out the VE clause for special criticism. We also are inclined to believe that the DoD and defense industry have not yet had enough operating experience under the 1967 revision to warrant an immediate, comprehensive revision effort. The upswing in both numbers of and savings from approved VECPs in the first quarter of FY 1968 may, indeed, indicate a much more satisfactory and better understood VE ASPR with the 1967 revision.

This is not to say, however, that efforts to improve the VE ASPR provisions should cease. The SAVE ad hoc committee's material and the industry suggestions listed above should be given every consideration in a continuing DoD review of experience and problems under the new ASPR revision. LMI offers three additional related suggestions:

- The DoD should consider setting a minimum contractor savings sharing percentage of 50% of

instant contract savings on all fixed-price contracts containing VE incentive clauses--with provision for the contracting officer to allow a savings share as high as 75% to a contractor where there is unusually high industry VE risk and investment.

- The DoL should consider restricting use of the VE program requirement clause (funded) to indefinite design type contracts and prohibit its use on production type contracts where specifications are firm and the description of the product is sufficiently precise that the Value Engineering Incentive clause is appropriate.[1]

- The DoD should consider a basis for permitting "Government owned-contractor operated" ("GO-CO") plants to share in savings from their approved VECPs.

The 1963 LMI report stated: "Since value engineering is a dynamic technique and is still in the development stage, the ASPR VE incentive provision should be updated and revised from time to time to reflect any improvements in measurement standards, cost accounting techniques, engineering change procedure processing methods or any other new developments in the value

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[1]This recommendation is consistent with ASPR provisions reflected in ASPR 1-1702.3(b)(iii). It is also in consonance with recommendations contained in LMI document, "Final Report--Value Engineering," LMI Project 2A-2, May 8, 1963.

engineering technology. Experience with the use of the VE incentive provisions will also undoubtedly provide additional inputs for revising and modernizing the ASPR provision."[1]

Conclusion E Defense industry will probably increase its VE activity if the DoD closely monitors experience and problems under the current VE ASPR provisions and makes timely corrective revisions as necessary to maintain strong motivation for industry VECP activity.

F. EXTENT OF UNDERSTANDING OF THE DoD VECP PROGRAM THROUGHOUT THE DoD AND DEFENSE INDUSTRY

Industry study contacts supplied LMI with information indicating inadequate understanding of the intent, objectives and procedures of the DoD VECP Program by some concerned DoD personnel. Some frequently voiced comments were:

- Some DoD personnel with whom the contractor dealt were not familiar with the provisions of the June 1, 1967 VE ASPR revision.
- Some DoD buying offices and program managers assign too low a priority to the processing of industry VECPs, despite the ASPR language: "Finally, to realize the cost reduction potential of value engineering, it is imperative that value engineering change proposals be processed by all parties as expeditiously as possible."[2]

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[1] LMI document, "Final Report--Value Engineering," LMI Project 2A-2, May 8, 1963.

[2] ASPR, Sec. 1-1701(b).

- Some DoD contract negotiators include VE program requirement clauses in contracts with no pay-off expectation or intent to follow through.

LMI noted an inadequate understanding of the DoD VECP Program by some concerned defense industry personnel. For example, we found that:

- Top industry management does not always fully understand the intent and objectives of the DoD VECP Program and, consequently, sometimes fails to give it full support. Where top management does fully understand the program's objectives, we usually found aggressive, successful contractor VECP programs.
- Where contractors focus their attention on the "savings sharing" potential to themselves from the DoD VECP Program and relate these shares to augmentation of their income and to return on their VE investment--rather than to "cost reduction" to the DoD--we found top management support was usually not a problem. For example, one large contractor, which had received over $1 million in savings shares from its accepted VECPs, noted: "The $1 million plus profit enhancement is equivalent to $20 million in new business." Another company's VE plan provides: "Profit increases, and improvements in competitive edge, are the major overall objectives of the VE program." The VE handbook of a third contractor

states: "The results obtained by applying these principles and techniques can greatly enhance the competitive position of the . . . company, thus ensuring a steady flow of future business and job security for the company's employees."

- Some contractors appear to put too low a level of investment into their overall VE effort. For example, the NASSA VE questionnaire showed that the level of VE investment ranged from 3/100ths to 1/10th of 1% of annual sales in five member companies; the 1963 LMI report stated that 1/10th to 1/2 of 1% of total annual sales appeared to be a reasonable level of investment for VE.

- Some contract administration and comptroller personnel in defense industry do not fully understand the intent and objectives of the DoD VECP Program and, consequently, fail to pursue it agressively and fail to give proper visibility to industry benefits realized from the program.

- Some contractor personnel suggest that the definition of a VECP be expanded to include such things as improved performance and improved readiness even where they do not result in a reduction of overall costs.

LMI concludes that there are still misunderstandings of the DoD VECP Program by some interested personnel on both sides of the VECP fence.

During the last five years, top Defense Department management has enthusiastically pursued and promoted the DoD VE and Cost Reduction Programs--including implementing virtually all of the 1963 LMI VE recommendations. Some of the more significant actions taken during calendar year 1967 alone were:

- January: DoD published a VE pamphlet, "Reduce Costs and Improve Equipment Through Value Engineering."
- February:
  - The Secretary of Defense sent a memorandum to the President on FY 1965-1966 results in the Defense Contractor Cost Reduction Program.
  - Series of Defense-Industry Joint Cost Reduction Workshops--with a VE panel--commenced. Eight joint meetings held with over 1,000 participants.
- March: The Assistant Secretary of Defense (Installations and Logistics) initiated the Defense Industry VE Program Review by LMI.
- April:
  - The Assistant Secretary of Defense (Installations and Logistics) addressed a memorandum to the logistical secretaries of the military departments and DSA, noting a downward trend in industry VECPs, and stating that he considered it a prime responsibility of DoD program and buying office managers to insure prompt and objective action on value engineering proposals.

- 1967 SAVE National Conference:
  - The Deputy Chief of Staff for Systems and Logistics, USAF, addressed the conference and advised: "We have requested the Commander of the Systems and Logistics Commands to inform each procurement officer, each contract administration officer, and each person in each System Program Office of the advantages to the Air Force in encouraging the submission of Value Engineering Change Proposals."
  - The Deputy Assistant Secretary of Defense for Equipment Maintenance and Readiness said: "I can assure you that there is under way within the Department of Defense an intensification of effective communication to our buying and engineering organizations of the importance of encouraging VECPs because of their mutual benefit both to the Department of Defense and to the contractor."

- June: Revision No. 23 to VE ASPR provisions issued.

- July: The Secretary of Defense sent a memorandum to the President reporting FY 1967 progress in the DoD Cost Reduction Program.

- September:
  - DoD internal VE Conference (some 400 participants).

- The Secretary of Defense sent a memorandum to the Secretaries of the Military Departments and the Director of DSA broadening the DoD Logistics Management Improvement Program to include management improvement areas in addition to those presently included in the DoD Cost Reduction Program. The new areas are to be measured on the basis of performance rather than dollars saved. Two of the new areas will be:
  - VECPs in Process Over 60 Days -- goal will be to decrease percentage of VECPs held by DoD over 60 days by 10% for FY 1968 and FY 1969, respectively.
  - Letter Contracts -- goals will be to keep use of letter contracts to an absolute minimum and to accelerate the definitization of issued letter contracts as rapidly as possible.

- October: The Assistant Secretary of Defense (Installations and Logistics) sent a letter to the presidents of the 85 parent companies participating in the Defense Contractor Cost Reduction Program, stating that participants would be permitted to report savings to the Defense Department on firm-fixed-price contracts from their approved VECPs.

- December: The Secretary of Defense sent a memorandum to the President on FY 1967 results in the Defense Contractor Cost Reduction Program. With respect to value engineering, the Secretary advised:

"Defense has also increased financial incentives to encourage Defense contractors to seize every opportunity to eliminate non-essential design and performance features through value engineering."

- Other DoD Actions During 1967:
  - DoD Value Engineering Handbook H-111 under revision (target date for publication--summer of 1968).
  - Basic VE Dod Instruction 5010.8 under revision (target date for issue--April 1968).

It may be that the many DoD actions are beginning to have the desired effect--an upward trend in industry VECP submissions, approvals and savings. Reports for the first quarter of FY 1968 in the VECP Reporting System show an upswing from prior quarters; 231 industry VECPs were approved with estimated savings to the DoD of $22.3 million. If this experience does indeed indicate a trend, it may be that defense industry has already been stimulated to a somewhat greater degree of VECP activity.

Nonetheless, it still appears to LMI that a further intensification of effort by both the DoD and defense industry will be necessary to insure a complete understanding of the DoD VECP Program at all interested levels.

Conclusion F - Increased defense industry VECP activity would be encouraged if all concerned personnel--in both the DoD and defense industry--had a better understanding of the intent, objectives and procedures of the DoD VECP Program.

III. RECOMMENDATIONS

LMI recommends four major courses of action designed to increase defense industry participation and effectiveness in the DoD VE Program through stimulating a much greater exploitation of the "savings sharing" potential of industry-initiated VECPs.

> Recommendation No. 1 - The DoD should further intensify and continue its educational, training and promotional efforts on the DoD VECP Program until a thorough understanding of that program's intent, objectives and procedures is ingrained in concerned personnel at all levels of the DoD and defense industry.

The DoD efforts which are warranted here are primarily further intensification, continuation and improvement of present activity and not any drastic changes in concept, policy or procedures.

Some specific recommendations which should lead to improved mutual understanding in both the DoD and defense industry are:

- Agenda Item at Joint DoD-Defense Industry Meetings
  In his December 22, 1967, memorandum for the President, the Secretary of Defense noted that the 1967 series of joint Defense-Industry regional workshops on the Defense Contractor Cost Reduction Program had been well received by both DoD and industry personnel and advised that the DoD planned to schedule joint meetings annually.

LMI recommends that the DoD VECP Program be made a major agenda item at the 1968 series of joint meetings. If this recommendation is adopted, LMI suggests that top level management from both the DoD and defense industry be invited to participate--as well as working level VE and cost reduction personnel. Defense industry comptroller and contract administration executives should also attend, as well as top level buying and program personnel from DoD headquarters and field offices. Such meetings would offer an ideal opportunity to:

- Eliminate misunderstandings of the DoD VECP Program at interested levels in both the DoD and defense industry and insure a receptive DoD "customer" to industry VECP activity.
- Emphasize the intent, objectives and procedures of the DoD VECP Program to those most directly concerned in defense industry and the DoD.
- Discuss the relationship of new DoD system development and procurement methods (Contract Definition, Life Cycle Procurement, Total Package Procurement) to the DoD VECP Program.
- Discuss both industry and DoD problems in the field with respect to the DoD VECP Program and develop recommendations to improve the program.

- Letter Contracts and VECP Performance Goals. LMI believes that the recent establishment of performance goals in the areas of "Letter Contracts" and "VECPs in Process Over 60 Days" will benefit DoD VECP Program operations significantly over a period of time. The recently increased use of letter contracts (and the large percentage of undefinitized ones) appears to create special problems in the DoD VECP Program--because of the frequent lack of adequate baselines for measurement of VECP benefits. The DoD performance goals in this area should ultimately benefit the DoD VECP Program. The same is true of the performance goals to be set in the area of "VECPs in Process Over 60 days."

  LMI recommends that the DoD consider going further in this area and, perhaps, establish numerical and dollar goals for industry-initiated VECPs for the Military Departments and DSA. Such goals would help to insure that all interested levels of the DoD give adequate attention to industry VECP activity.

- DoD VECP Program Guidance. LMI recommends that the DoD effect early publication of the revised basic DoD VE instruction and the revised VE Handbook H-111. The update of H-111 should be particularly helpful to the buying offices and program managers of the DoD.

- Publicity Performance and Communications. LMI recommends that the DoD continue to give appropriate publicity to "savings shares" awarded to specific, although unidentified, contractors as a result of their approved VECPs.

  It is also recommended that the DoD compile and periodically publish defense industry VECP performance reports--by broad industry categories. Publication of "average" VECP performance records by such categories (without identifying any specific contractors) would make it possible for a company to compare its VECP performance with the "average" or "norm" for its industry category and should stimulate greater VECP activity.

  We also recommend that the OSD Value Engineering Directorate continue to maintain direct communication with selected major Defense contractors with respect to their VECP programs; the DoD should also consider augmenting the personnel capability of that directorate to permit field trips to these contractors' plants to explain the benefits of the program to local plant managers and to help resolve local problems.

Recommendation No. 2 - The DoD should continue and intensify its efforts to improve the operations of its systems for configuration control and make an immediate, special effort to improve the DoD processing of industry VECPs.

We recommend that special efforts be devoted to improving engineering change proposal processing flow time and "feedback" to contractors regarding the status of ECPs, including VECPs, and DoD reasons for rejections. The forthcoming DoD-wide system for controlling engineering and design changes is expected to include features which should cause an increase--perhaps a substantial increase--in the number of VECPs carrying an "urgent" priority classification and thus receiving more expeditious processing. We attach considerable importance to early action by the DoD to put the system into effect.

In the specific area of VECP processing, it is recommended that the DoD take appropriate actions designed to:

- Encourage early establishment of VECP communications channels by DoD personnel with their industry counterparts.
- Specify a fixed period of time within which action must be taken on industry VECPs and specify the minimum content of acceptable "feedback".
- Preclude acceptance of valid industry VECPs as non-VECPs by the DoD.

Recommendation No. 3 - The DoD should closely monitor experience and problems under the current VE ASPR provisions (Revision No. 23) and make timely corrective revisions as necessary to maintain strong motivation for industry VECP activity.

LMI recommends that special attention be given to the questions:

- Are defense industry recommendations with respect to the VE ASPR provisions given continuing consideration?
- Are DoD buying office and program manager personnel familiar with the current VE ASPR provisions?
- Are "savings sharing" percentages to contractors in line with the DoD VECP Program and ASPR intent?
- Should not a <u>minimum</u> contractor "savings sharing" percentage of 50% of instant contract savings be prescribed on all fixed-price contracts containing VE incentive clauses?
- Is the VE program requirement clause being properly employed and monitored?
- Are subcontractors being encouraged to participate in the DoD VECP Program?
- Are defense industry "savings shares" being paid within a reasonable time?
- Should not "Government-owned-contractor operated" plants be permitted to share (possibly to a lesser degree) in savings from their approved VECPs?

Recommendation No. 4 - Defense industry management should also intensify its educational, training and promotional efforts on the DoD VECP Program to insure that the program's intent, objectives and procedures are thoroughly understood by concerned personnel at all levels of the defense industry.

Top defense industry management support of the DoD VECP Program would probably increase if contractors would relate their "savings shares" to augmentation of their income and to return on their VE investment--rather than to "cost reduction" to the DoD.

Intensified educational and training efforts aimed at comptroller and contract administration personnel in defense industry appear to be desirable.

In the specific area of industry VECP preparation and processing through the DoD, LMI recommends that greater industry emphasis be placed upon such matters as:

- Reduction of length of VECP processing time within industry itself.
- Improvement of the quality of industry VECPs--with more complete supporting technical information and cost analyses.
- Establishment of early and continuing VECP communications channels with DoD counterparts.

EXHIBIT 1

ASSISTANT SECRETARY OF DEFENSE
Washington, D. C.

Installations and Logistics DATE: 21 March 1967

TASK ORDER SD-271-69
(TASK 67-16)

1. Pursuant to Articles I and III of the Department of Defense Contract No. SD-271 with the Logistics Management Institute, the Institute is requested to undertake the following task:

A. TITLE: Defense Industry Value Engineering Program Review

B. SCOPE OF WORK: The purpose of this task is to determine whether significant opportunities exist for increasing defense industry participation and effectiveness in the DoD Value Engineering Program. In performing this task, LMI will:

1) Interview defense industry management to review the status of the DoD VE Program in their organizations and to solicit suggestions regarding means for increasing the degree of program participation and productivity.

2) Analyze industry data on the VE Program.

3) Submit a report depicting the results of this review.

2. SCHEDULE: A final report will be submitted by 31 August 1967.

/S/ Paul R. Ignatius

ACCEPTED /S/ Barry J. Shillito

DATE March 21, 1967

EXHIBIT 2

COMPANIES AND PLANTS VISITED

Aerojet-General Corporation

- Sacramento Plant* -- Sacramento, California
  - Liquid Rocket Operations
  - Solid Rocket Operations

Bell Aerospace Corporation

- Bell Helicopter Company -- Fort Worth, Texas

The Boeing Company

- Aerospace Group* -- Seattle, Washington
  - Missile and Information Systems Division
  - Space Division

Fairchild Hiller Corporation

- Aircraft Service Division -- St. Petersburg, Florida

General Dynamics Corporation

- Fort Worth Division* -- Fort Worth, Texas
- Pomona Division* -- Pomona, California

Honeywell, Incorporated

- Aeronautical Division, Military Products Group -- St. Petersburg, Florida
- Ordnance Division, Military Products Group -- Hopkins, Minnesota

Hughes Aircraft Company

- Aeronautical Systems Division, Aerospace Group* -- Culver City, California

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*Also assisted LMI in its original Value Engineering study in 1962 and 1963.

Ling-Temco-Vought, Incorporated

- LTV Aerospace Corporation -- Dallas, Texas
  - Missiles and Space Division -- Dallas, Texas
  - Missiles and Space Division -- Warren, Michigan
  - Range Systems Division -- Dallas, Texas
  - Vought Aeronautics Division -- Dallas, Texas
- LTV Electrosystems, Incorporated -- Dallas, Texas
  - Continental Electronics Mfg. Co. -- Dallas, Texas
  - Garland Division -- Dallas, Texas
  - Greenville Division -- Greenville, Texas
- LTV University Division -- Oklahoma City, Oklahoma

Litton Industries, Incorporated

- Data Systems Division -- Van Nuys, California
- Guidance and Control Systems Division* -- Woodland Hills, California

Lockheed Aircraft Corporation

- Lockheed-Georgia Company* -- Marietta, Georgia
- Lockheed Missiles and Space Company -- Sunnyvale, Cal.
  - Missile Systems Division
  - Research and Development Division
  - Space Systems Division

Martin Marietta Corporation

- Orlando Division, Martin Company* -- Orlando, Florida

McDonnell Douglas Corporation

- Aircraft Division, Douglas Aircraft Company* -- Long Beach, California
- Missile and Space Systems Division, Douglas Aircraft Company -- Huntington Beach, California

North American Rockwell Corporation

- General Offices -- El Segundo, California
- Autonetics Division* -- Anaheim, California
- Los Angeles Division* -- Los Angeles, California
- Rocketdyne Division* -- Canoga Park, California

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Northrop Corporation

- Northrop Norair* -- Hawthorne, California

TRW Incorporated

- TRW Systems -- Redondo Beach, California

*Also assisted LMI in its original Value Engineering study in 1962 and 1963.