

DOCUMENT RESUME

04145 - [B3214475]

Department of Defense Value Engineering Program Needs Top Management Support. P&AD-78-5; 165767. November 16, 1977. 20 pp. + 2 appendices (4 pp.).

Report to the Congress; by Elmer B. Staats, Comptroller General.

Issue Area: Federal Procurement of Goods and Services (1900);  
Federal Procurement of Goods and Services: Notifying the Congress of Status of Important Procurement Programs (1905).

Contact: Procurement and Systems Acquisition Div.

Budget Function: National Defense: Weapon Systems (057);  
National Defense: Department of Defense - Procurement & Contracts (058).

Organization Concerned: Department of Defense.

Congressional Relevance: House Committee on Armed Services;  
Senate Committee on Armed Services; Congress.

The Department of Defense (DOD) value engineering program for contractors was set up to stimulate contractors to develop and propose cost saving changes to contracts requiring unnecessary expense. Although savings on some major programs have been impressive and show that costs for major Defense weapon systems can be cut down considerably, few systems have active value engineering programs. Findings/Conclusions: The program has already saved over \$700 million, but savings have declined sharply since 1971, and the program has fallen far short of its potential. Savings for 1975 and 1976 were the lowest since 1967. Most major programs being developed and produced during 1976 had no savings at all, including many with very high price tags. The lack of Defense management acceptance and support has been the basic and most critical factor impeding the performance of the value evaluation program, and correction of this weakness is the most essential need of the program. The lack of management support has been the most pronounced in the Navy and the Air Force. Savings of \$1 billion in the next 4 years can be achieved if DOD's assessment of the program's minimum savings potential is realized. Recommendations: The Secretary of Defense should take steps to guarantee aggressive support and active promotion of the value engineering program by service secretaries and managers and, in conjunction with Congressional Appropriations Committee hearings on major weapon systems, inform the Congress of value engineering program savings on those systems. (Author/SC)

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# *REPORT TO THE CONGRESS*

*BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES*

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## Department Of Defense Value Engineering Program Needs Top Management Support

The Defense value engineering program, designed to motivate contractors to help cut costs, is saving far less than it can. A lack of support by top-level Defense managers has been the basic cause. If Defense can improve management support to achieve its estimate of the program's minimum savings potential, \$1 billion can be saved in the next 4 years. GAO recommends action to insure aggressive support and active promotion of the program by the service secretaries and managers.



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20546

B-165767

To the President of the Senate and the  
Speaker of the House of Representatives

This report examines the performance of a major Department of Defense cost saving program and discusses its basic weakness.

Our review of this program was prompted by our interest in the effectiveness of Defense efforts to control the acquisition and ownership costs of military equipment.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Acting Director, Office of Management and Budget; the Secretary of Defense; and the Secretaries of the Army, Navy, and Air Force.

A handwritten signature in black ink, appearing to read "James B. Stacks".

Comptroller General  
of the United States

D I G E S T

The Department of Defense value engineering program for contractors was set up to stimulate contractors to develop and propose cost saving changes to contracts requiring unnecessary expense. (See p. 1.)

Defense says the program can save at least \$250 million a year. (See p. 11.) The program has already saved over \$700 million. However, savings have declined sharply since 1971, and the program has fallen far short of its potential. Savings in 1975 and 1976 were the lowest since 1967. (See pp. 4 and 5.)

Some major weapon system programs have been a source of large savings:

--Five weapon system programs alone accounted for \$24 million, or over half of all savings in 1976.

--One program alone accounts for \$50 million in savings over the past 6 years. (See pp. 7 and 8.)

But, while the savings on some major programs have been impressive and show that costs for major Defense weapon systems can be cut down considerably, few systems have active value engineering programs. Their savings potential is largely untapped.

Most major programs being developed and produced during 1976 had no savings at all, including many with very high price tags, such as the

--\$6 billion Air Force F-16 fighter,

--\$18.8 billion Navy Trident submarine and missile, and

--\$5.9 billion Army Patriot missile.  
(See pp. 8 to 11.)

Defense managers' lack of acceptance and support has been the basic factor weakening the value engineering program for contractors. The lack of support has been the most pronounced in the Navy and Air Force.  
(See p. 12.)

Without aggressive support from top-level service management, the program probably will never approach its full potential.

Savings of \$1 billion in the next 4 years can be achieved if Defense's assessment of the program's minimum savings potential is realized. (See p. 11.)

#### RECOMMENDATIONS

The Secretary of Defense should

- take steps to guarantee aggressive support and active promotion of the value engineering program by service secretaries and managers (see p. 18) and
- in conjunction with Congressional Appropriations Committee hearings on major weapon systems, inform the Congress of value engineering program savings on those systems (see p. 18).

#### AGENCY COMMENTS

The Department of Defense agrees that it should take steps to insure support and promotion of the program by the service secretaries and managers. It believes that actions by the Office of the Secretary of Defense in the past year constitute such measures. (See p. 19.)

GAO agrees that the earlier actions are constructive, but believes that more are needed.

The Department of Defense expressed some concern about the method to be used to inform the Congress of savings on major weapon systems, but suggested that some derivative of the annual service reports to the Office of the Secretary of Defense might be developed for this purpose. (See p. 19.)

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### ABBREVIATIONS

DOD	Department of Defense
GAO	General Accounting Office
VE	value engineering

## CHAPTER 1

### INTRODUCTION

#### VALUE ENGINEERING PROFILE

The concept of value engineering is largely a by-product of material shortages during World War II. These shortages led to the creation of innovative material and design alternatives and it was found, in many cases, that the alternate approaches functioned as well, or better, and cost less. From this beginning, an analytical discipline later evolved in private industry which was structured to challenge the proposed way of doing things and systematically search for less costly alternatives. Commonly known as value engineering, it is sometimes termed value analysis, value control, value improvement, or value management.

Value engineering involves a systematic analysis of each function to be performed by an item with the objective of achieving the function at the lowest overall cost consistent with performance, reliability, quality, and maintainability requirements. In essence, the prevailing viewpoint of value engineering analysis is that while anything providing less than the essential functional capability is unacceptable, anything providing more is unnecessary and wasteful and should be eliminated or modified. Those features or characteristics of an item which exceed actual needs and contribute nothing to essential functional capability are often called "gold plating."

#### DOD VALUE ENGINEERING PROGRAM

The Department of Defense (DOD) established its value engineering (VE) program in 1963, and it consists of two distinct elements. The first is an in-house effort wherein VE is performed by defense personnel. The second is DC's VE program for contractors which was created to stimulate them to develop and submit VE proposals for changes to those contract specifications, purchase descriptions, or statements of work which the contractors feel impose costly, nonessential requirements. The incentive is provided by giving the contractor a share of the savings resulting from the change proposals it submits.

The VE program for contractors is implemented through the inclusion of value engineering clauses in contracts. Two different types of clauses are used--an incentive clause and a program requirement clause.



The VE incentive clause is intended to encourage the contractor to voluntarily develop and submit VE change proposals and rewards it with a share of the savings resulting from each proposal that is accepted. This clause is used principally on production contracts.

The VE program requirement clause obligates the contractor to conduct a sustained VE effort at a prescribed level. This effort is directly reimbursed as a contract line item, and the contractor also shares in the savings resulting from each accepted proposal. The contractor's sharing rate under this arrangement is considerably less than under the incentive clause. The program requirement clause is designed primarily for contracts covering conceptual validation and full-scale development phases of a program.

VE clauses are unique in that they provide the only incentive specifically designed for cost reduction contract changes. All other incentives are designed to apply only within the scope of work of the contract.

The Assistant Secretary of Defense, Installations and Logistics, is responsible for providing overall policy guidance for the program and for reviewing program performance. (Installations and Logistics was redesignated Manpower Reserve Affairs and Logistics earlier this year. Later pages of this report, however, still refer to Installations and Logistics, since that designation was in force during the specific time frame of the references.)

The direct responsibility for program promotion and implementation in the services is vested in the Secretaries of the Army, Navy, and Air Force. This includes insuring that key Defense personnel--program/project directors and managers and others--encourage contractors to develop and submit cost saving VE change proposals.

#### OUR PREVIOUS REPORTS ON VALUE ENGINEERING

We have a longstanding interest in the use of VE as a means to help reduce Government acquisition and ownership costs and have previously issued the following:

- A report to the Congress in May 1975 which led to the establishment of a value engineering program by the Environmental Protection Agency to reduce the cost of waste treatment plants.

--A report to the Congress in May 1974 on the need for increased use of value engineering in Federal construction.

--A report to Representative Larry Winn, Jr., in May 1972 recommending that the Maritime Administration reinstate and improve value engineering provisions in ship construction contracts.

--A report to the Congress in August 1969 on the opportunities for increased savings by improving the management of DOD's value engineering program for contractors.

### SCOPE OF REVIEW

We found in the review leading to our August 1969 report to the Congress that the DOD VE program for contractors had not produced the desired results. The purpose of this review was to reexamine the progress and current status of that program.

Although the program is also applicable to other DOD agencies, we concentrated our review on the three military services since most of total Defense procurement is made by them, and the effectiveness of the program is largely dependent upon what they do. To illustrate, about 99 percent of DOD's fiscal year 1975 and 1976 total procurement obligation authority was for Army, Navy, and Air Force procurement, and over 97 percent of the total VE program savings reported in the past 6 years was produced by the services.

The attention given to the military services, however, should not be taken as an indication that we believe important savings opportunities do not exist or should not be pursued in other Defense agencies. We also recognize that there probably is good potential for VE savings on many smaller procurement programs.

We interviewed DOD, Army, Navy, and Air Force Headquarters officials and reviewed documents, records, and reports related to the DOD VE program for contractors. We also participated in a Value Engineering Congress sponsored by the Air Force Systems Command at Andrews Air Force Base early this year. Here, representatives of 20 major defense contractors and Air Force and other agency representatives conferred in a 2-day workshop to identify the problems impeding the VE program for contractors and to jointly develop recommended solutions.

## CHAPTER 2

### VE PROGRAM SAVINGS PERFORMANCE

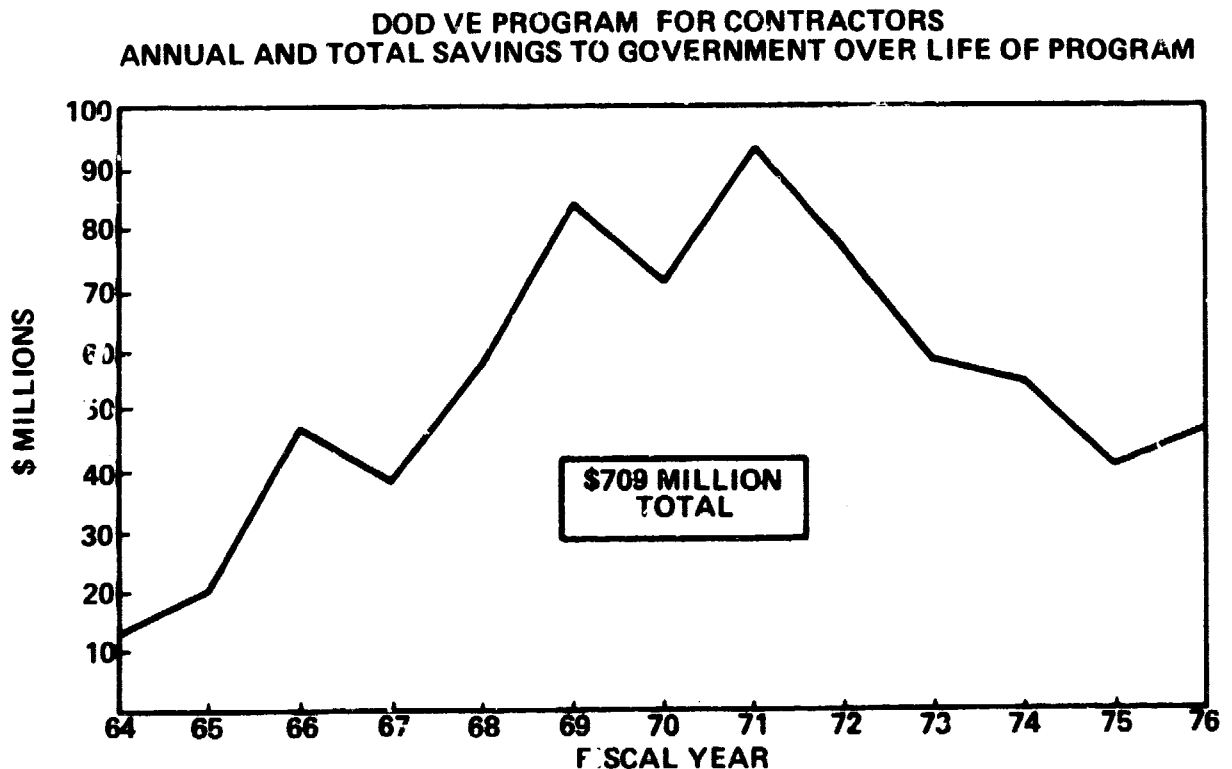
The DOD VE program for contractors has produced reported savings to the Government of over \$700 million during the 13-year life of the program through June 1976. We found, however, that savings have declined substantially in the past 5 years and that the program has fallen far short of its potential.

#### DOD OVERALL

As seen in figure 1, annual savings trended upward to a peak of nearly \$95 million in fiscal year 1971 and have since dropped to about half that level. Savings in 1975 and 1976 were the lowest since 1967.

An upturn in 1976 was the first break in the downward pattern since 1971. It was due mainly to an increase in Navy's savings but, as discussed further on page 7, this increase does not appear to be a significant future trend indicator.

FIGURE 1



The dollars charted in figure 1 are the actual savings reported each year and, if adjusted for inflation, the decline since 1971 would be even more pronounced. We did not attempt to analyze the actual rates of inflation for the various categories of defense hardware in this period, but if an average annual rate of only 5 percent were assumed, savings of \$41.4 million in 1975 and \$47.6 million in 1976 would be equivalent to about \$34 million and \$37 million, respectively, in 1971 dollars. When compared to the \$94.5 million reported in 1971, the adjusted 1975 and 1976 savings then show constant dollar decreases of over 60 percent.

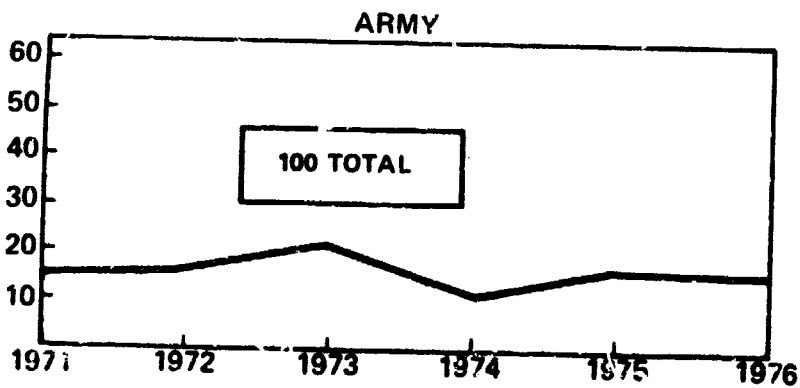
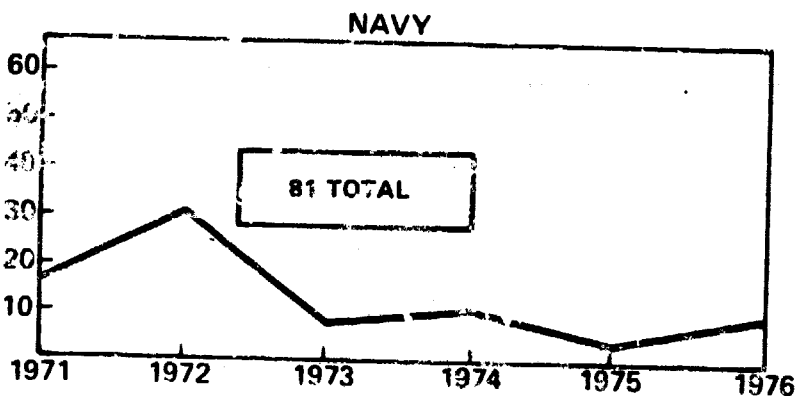
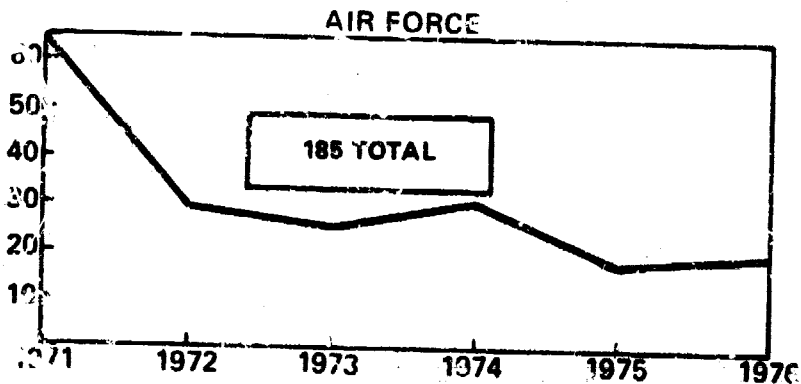
We examined the levels of procurement authorized in this period to determine to what extent the decline in VE savings since 1971 might have resulted from less buying. We learned that DOD's unadjusted annual total procurement obligation authority was higher in all but 1 year of the period 1972 through 1976 than it was in 1971. Uniformly applying the same assumed 5 percent annual inflation rate adjustment used on VE savings, we found that average constant dollar obligation authority in that period was down less than 8 percent and the lowest, which was granted in 1975, was about 18 percent less than fiscal year 1971. Fiscal year 1976 obligation authority increased substantially and nearly equaled 1971 in constant dollars. In light of this, we believe that reduced procurement was not a major factor in the sharp decline in VE program savings.

The VE savings performance of each of the military services during the period from the program peak in fiscal year 1971 through 1976 is shown in figure 2 on page 6. The dollars charted are the savings actually reported in each year and have not been adjusted for inflation.

#### AIR FORCE

The Air Force accounted for two-thirds of the total VE savings produced by the services in 1971 and, while in all but 1 later year it continued to maintain a higher level of savings than the Army or Navy, its abrupt drop in 1972 and subsequent failure to recover has been a prominent factor in the overall decline of the DOD VE program for contractors. The Air Force Systems Command is responsible for the development and acquisition of the Air Force space and ballistic missile, aeronautical, and electronic systems. The Systems Command has been the source of most of Air Force's VE savings, and the decline in Air Force savings is essentially a reflection of this Command's performance.

**FIGURE 2**  
**DOD VE PROGRAM FOR CONTRACTORS**  
**ANNUAL AND TOTAL SAVINGS TO THE GOVERNMENT BY MILITARY SERVICES**  
**FOR FISCAL YEARS 1971 THRU 1976**  
**\$ IN MILLIONS**



## NAVY

The Navy achieved a substantial savings increase in 1972 which partially offset the Air Force drop in that year. But Navy's performance fell sharply in 1973 and it too has failed to recover. Since 1972 the Navy has consistently produced the least savings. Although Navy's savings increased in 1976, this does not appear to signal a significant recovery trend. The increase came primarily from a few high-value cost reduction changes on Naval Air Systems Command acquisitions. An Air Systems Command official advised us that there had been no substantive change or improvement in that Command's VE program which would support an expectation for a continuing upward trend in savings productivity. Naval Sea Systems Command and Naval Supply Systems Command savings actually declined 49 percent and 86 percent, respectively, in 1976.

## ARMY

Army's VE savings performance has been relatively stable and, although the Army has not achieved real sustained growth in savings, it has exceeded its fiscal year 1971 performance in terms of unadjusted savings dollars in all but 1 year since 1971. This is something the Navy accomplished only once and the Air Force not at all in this period.

While the Army ranked well below the Air Force and not greatly higher than the Navy in terms of total savings from 1971 through 1976, the amount which each service buys must also be considered in an evaluation of their relative performance. For example, in fiscal years 1975 and 1976, the Army, with only 15 percent of the combined total procurement obligation authority of all three services, produced 38 percent of the savings, the Air Force, with 2.4 times as much obligation authority, produced only 45 percent of the savings; and the Navy, with nearly as much obligation authority as the Army and Air Force combined, produced only 17 percent of the savings. By this measurement, the Air Force VE program was only about half as productive, and the Navy program only one-seventh as productive as Army's in 1975 and 1976.

## MAJOR PROGRAMS IN GENERAL

Major programs have been defined by DOD, in part, as acquisitions which have an estimated research and development cost in excess of \$50 million or an estimated production cost in excess of \$200 million. The thresholds were increased to \$75 million and \$300 million, respectively, in January 1977. These programs have been a source of substantial savings under the DOD VE program for contractors. The

Air Force F-15 fighter aircraft program is a rotatable example. Savings to DOD resulting from contractor-initiated VE change proposals are reported to have totaled more than \$50 million on the F-15 over the past 6 years.

In fiscal year 1976, Navy's major program VE savings were only \$652,000--less than 7 percent of Navy's total savings--but major programs were the source of 74 percent of the combined total VE savings reported by the Army and the Air Force. Army's major program savings amounted to \$9.7 million and accounted for 59 percent of Army's total 1976 VE savings. Two programs alone, the Army Ammunition program with savings of \$6.6 million and the Dragon missile with savings of \$1.3 million, accounted for most of Army's major program savings.

Air Force's major program savings amounted to \$17.9 million and accounted for 87 percent of Air Force's total 1976 VE savings. Here also, two programs--the F-15 with savings of \$14.1 million and the Airborne Warning and Control System (AWACS) aircraft with savings of \$1.5 million--accounted for most of the Air Force major program savings.

A total of only five major programs--three Air Force and two Army--were the source of over 50 percent of DOD's total fiscal year 1976 VE savings.

While the savings on some major programs have been impressive and indicate high-level savings potential for DOD major weapon systems, the systems with active VE programs are few in number, and their potential is largely untapped. Most major programs in development and production in fiscal year 1976 had no VE savings.

Only 24 out of a total of 88 major DOD programs we checked reported any VE savings in 1976. The Army and the Air Force each reported savings in 1976 on only 10 major programs and the Navy only 4. Over three-fourths of the 88 programs contained VE clauses in their contracts, but 65 percent of those with VE contract clauses produced no savings.

All 43 production programs we checked had VE contract clauses, but only 19 produced savings. All Army production programs generated savings, but 81 percent of the Navy and 58 percent of the Air Force production programs did not.

Nearly two-thirds of the 32 full-scale development programs we checked had VE contract clauses, but only 2 of those those generated savings. None of the Army's 12 full-scale

development programs produced VE savings in fiscal year 1976 and only 4 had VE clauses. The Navy's two full-scale development programs had no VE contract clauses and produced no savings. Although the Air Force provided VE contract clauses for all but 2 of its 18 full-scale development programs, 88 percent of those with VE contract clauses generated no savings.

Six out of a combined total of 13 programs we checked in the advanced development or validation phase had VE contract clauses and half of those with VE clauses produced no savings. Eight of the 13 were Air Force programs; 5 of these had VE contract clauses and 3 of those generated savings. No Army or Navy advanced development programs produced VE savings in 1976.

### BILLION-DOLLAR MAJOR PROGRAMS

We were especially interested in DOD's VE savings performance on its most expensive weapon systems. We included in the 88 major programs we examined nearly all of those in production or development during fiscal year 1976 which were identified on a DOD inventory of major acquisitions as having an estimated acquisition cost exceeding \$1 billion. Eleven of these were Air Force programs, 24 were Navy, and 10 were Army, costing a total of \$73 billion, \$102 billion, and \$24 billion, respectively. The estimated combined acquisition cost of all 45 programs was almost \$200 billion as of June 30, 1976.

We found that 78 percent of these high-cost programs, including many with recent substantial inflation cost increases, had no VE savings in 1976.

### Air Force

Five of the 11 Air Force billion-dollar programs were in production. Three production programs and one full-scale development program produced VE savings, but the balance of two production programs, three full-scale development programs, one validation phase program, and one advanced development program did not. Included among the seven Air Force billion-dollar programs with no VE savings in fiscal year 1976 were the:

- B-1 bomber aircraft, in full-scale development and estimated at \$21.6 billion as of June 30, 1976. (Production of this aircraft has since been canceled.)
- F-16 fighter aircraft, in full-scale development and estimated at \$6 billion.



- Advanced Medium Short Takeoff and Landing Transport (AMST) aircraft, in validation and estimated at \$6 billion.
- Advanced Tanker Cargo Aircraft (ATCA), in advanced development and estimated at \$2.9 billion.
- Short Range Attack Missile (SRAM), in production and estimated at \$2.4 billion.

All but the B-1 and AMST programs had VE clauses in 1976.

### Navy

Twenty of the 24 Navy billion-dollar programs were in production and had VE contract clauses, but only 3 produced VE savings in 1976. The balance of two full-scale development programs and two advanced development programs produced no savings. Included among the 21 Navy billion-dollar programs with no VE savings in fiscal year 1976 were the:

- Trident submarine and missile, in production and estimated at \$18.8 billion as of June 30, 1976.
- F-18 fighter aircraft, in full-scale development and estimated at \$12.8 billion.
- F-14A fighter aircraft, in production and estimated at \$8.7 billion.
- CVN-68 Class aircraft carrier, in production and estimated at \$4.6 billion.
- P-3C patrol aircraft, in production and estimated at \$3.5 billion.
- A-7E attack aircraft, in production and estimated at \$3.2 billion.
- Tomahawk cruise missile, in advanced development and estimated at \$2.3 billion.
- Undersea Sound Surveillance System (SOSUS), in production and estimated at \$2.1 billion.
- Destroyer Tender, in production and estimated at \$1.3 billion.
- Fleet Oiler, in production and estimated at \$1.2 billion.

Except for the F-18, all of the above programs had VE contract clauses in 1976.

### Army

Three of the 10 Army billion-dollar programs were in production and generated VE savings, but the balance of 5 full-scale development and 2 advanced development programs did not. Included among the seven Army billion-dollar programs with no VE savings in fiscal year 1976 were the:

- Patriot missile, in full-scale development and estimated at \$5.9 billion as of June 30, 1976.
- Utility Tactical Transport Aircraft System (UTTAS) helicopter, in full-scale development and estimated at \$3.4 billion.
- XM-1 tank, in advanced development and estimated at \$4.9 billion.
- Advanced Attack Helicopter (AAH), in advanced development and estimated at \$3.5 billion.

Although Patriot had a VE clause in its contract, UTTAS, which was also in full-scale development during 1976, did not. Neither the XM-1 nor the AAH advanced development programs had VE clauses.

### SAVINGS POTENTIAL

In 1975 the Director, Defense Research and Engineering, and the Acting Assistant Secretary of Defense, Installations and Logistics, jointly urged revitalization of the DOD VE program for contractors and stated that the program had a potential of saving the Government at least \$250 million a year. This level of savings is equivalent to less than 1.5 percent of DOD's fiscal year 1975 total procurement obligation authority and, in view of the savings reported on those few major weapon systems with active VE programs, we have no reason to believe that this is an excessive estimate of the program's inherent worth.

VE program savings totaled only \$282 million during the period 1972 through 1976. Based on DOD's assessment of the program's minimum savings potential of \$250 million a year, savings of \$1 billion could be realized in the next 4 years.

### CHAPTER 3

#### WHAT'S WRONG WITH THE VE PROGRAM?

We wanted to know why, particularly during a period of mounting cost pressure and budgetary concern, the DOD VE program for contractors had slipped so badly and fallen so short of its cost saving potential. We found that the basic underlying cause has been a lack of management support for the program. This lack of support has been most pronounced in the Navy and the Air Force.

A 1975 report, prepared by the Office of the Assistant Secretary of Defense, Installations and Logistics, identified the Navy VE program as the least productive and cited the following reasons for its poor performance:

- No Navy management support for the VE program except in Naval Air Systems Command.
- No Navy effort to provide funding for the program.
- Sharp reductions in the number of Navy VE personnel assigned to support the program.
- No training for Navy personnel in the use and administration of VE contract clauses since 1970.

The same report noted degeneration of the Air Force Systems Command program since 1971 and related this decline to a drastic cut by Systems Command in its VE staffing. Inadequate funding for the Air Force VE program was also cited as a problem.

An official of the Air Force Directorate of Procurement Policy gave a briefing at GAO on the performance of the Air Force VE program in 1973. The record of that briefing shows the Air Force believed that the elimination of all full-time VE positions by Systems Command had resulted in a relaxation of management emphasis on the VE program and a subsequent lack of positive direction and control.

A permanent DOD VE Committee had been formed in 1964 and was assigned the responsibility for review of VE program performance and problems. The membership includes senior representatives from the military services, and the Committee is chaired by a representative of the Office of the Assistant Secretary of Defense, Installations and Logistics. We discussed the state of the program with the chairman and with each of the military service representatives in 1975 and again in 1976.

The official, serving as the Navy representative to the DOD VE Committee in 1975, told us that many in the Navy, including ranking people, did not support the VE program. The official informed us that, in addition to a lack of Command support, most Naval project officers did not favor and would not promote the VE program since it added to their workload and because the implementation costs of VE change proposals can require an outlay of current year project dollars for a savings return which might not be realized until future years. He said the Navy VE program also suffered from a lack of funding and a lack of skilled VE personnel.

The official told us that the Naval Air Systems Command was the only Navy Command that had a VE program for contractors and that the opposition to VE was particularly strong in the Naval Sea Systems Command. He said Sea Systems Command maintained that it hired only the most capable engineers and, although he did not share the belief, Sea Systems Command believed that this practice assured that it obtained the best designed equipment produced at the lowest cost. Furthermore, he stated that Sea Systems Command felt that acceptance of proposals for cost saving design changes from contractors would reflect unfavorably on the ability of the Command's engineers by giving the impression that ships could be designed for lower production cost.

A somewhat similar attitude toward VE was expressed by a spokesman for the Naval Facilities Engineering Command in hearings before the House Subcommittee on Military Construction Appropriations in 1975. In response to a question from a Subcommittee member relating to the use of value engineering in the design of Naval facilities, the Navy official said, in essence, that good basic engineering involves an analysis of all the costs of a facility and, if the engineering design job is done right, there is no place for "value" engineering. This official felt that "value" engineering was a term used by people who were uninformed about engineering.

When we returned to discuss the status of the Navy VE program for contractors in 1976, a different person was serving as the Navy representative to the DOD VE Committee. He and two other Navy officials who joined the discussion told us that lack of Navy's acceptance of the VE program was still the principal factor restraining its growth. They said the Navy, particularly Naval Sea Systems Command, was not convinced that the program was beneficial or properly applicable to the Navy. In support of Navy's reluctance to accept the program, they told us they believed there was a significant difference between

the design capability of Navy's engineers, who they viewed as top-flight, full-time, career professionals, and Army and Air Force operations people, who they said often performed engineering functions on a temporary or part-time basis.

They also told us that the Navy would need top-level DOD budgetary assistance to make improvements in Navy's VE program funding and staffing.

The Air Force representative to the DOD VE Committee in 1975 told us that the VE program for contractors was not actively promoted in the Air Force and that most Air Force program directors had little interest in it. He stated that the extent to which VE was used to reduce costs on a major program depended almost entirely upon which program director and contractor were involved. He cited an instance in which no savings were generated on a major Air Force program until there was a change in the program directors. The new director expressed a strong interest in receiving VE change proposals to lower program costs, and the contractor then responded with change proposals which did reduce costs.

He also told us that he believed the VE incentive clause was too permissive in that it left the extent of contractor participation up to the contractor and that contractors feel they get a better return by investing time and resources in self-initiated projects to generate cost savings which do not have to be shared with the Government. He felt that a reeducation of program directors, contractors, and top Air Force and DOD officials must take place before the VE program could work as it was intended.

When we returned to discuss the status of the Air Force VE program in 1976, a different person was assigned as the Air Force representative to the DOD VE Committee. He informed us that the main problem was still a lack of adequate support by Air Force program directors and that there continued to be little active promotion of the VE program by these key people and little effort to encourage contractor participation. He felt the biggest unrealized opportunities for Air Force VE program savings were on Systems Command major programs in the full-scale development phase of the acquisition cycle. He said that funding for the VE program was inadequate but that a new budgeting concept was being developed by the Air Force which would allocate specific funds for investment in VE program savings efforts on specific major programs in future Air Force budgets.

The Army representative to the DOD VE Committee served in that capacity both in 1975 and 1976. He informed us that the principal problem affecting implementation of the Army VE program for contractors stemmed from failure of the Army procurement and technical personnel to convince contractors that the Army really wanted them to submit change proposals. He said that the procurement and technical personnel have not taken advantage of available VE training courses and lack an understanding of the VE concept. This has resulted in reduced emphasis on the VE program. He also told us that the Army Training and Doctrine Command, Forces Command, and European Command had no organized VE programs. He felt that savings opportunities were being missed and that the Army VE program for contractors should be expanded to include these Commands.

The chairman of the DOD VE Committee believed that DOD's major weapon systems afforded the greatest opportunities for VE savings and he stressed the importance of the major system program or project manager's role in supporting the VE program and encouraging contractor participation. He explained, however, that the managers have, in the past, been concerned primarily with schedules and weapon systems performance and that the VE program for contractors adds to their workload. As a consequence of these factors, a project manager tends to ignore the VE program unless he has a particularly strong savings orientation. The chairman told us he was aware of cases in which it was alleged that the services have acted in ways which discouraged contractor participation in the program. He informed us that this had involved such things as refusing to include VE clauses in contracts when the clauses had been specifically requested by contractors and attempting to avoid sharing with a contractor any portion of the savings resulting from the contractor's VE change proposal.

Other DOD officials have also emphasized the need for management support and the importance of improving VE savings performance on major Defense systems. In a joint memorandum to the Assistant Secretaries of the military services in May 1975, the Director, Defense Research and Engineering, and the Acting Assistant Secretary of Defense, Installations and Logistics, noted that savings performance varied drastically between services and program offices, and ranged from zero to millions of dollars on individual major programs. The memorandum stated that service top-management support was required to improve the productivity of the VE program. In a similar vein, the Deputy Assistant Secretary of Defense (Materiel Acquisition), in a September 1975 memorandum to the Assistant Secretaries of the services and the Director, Defense Supply Agency (now Defense Logistics Agency), stated

that in order to achieve an improvement in VE program performance, it was essential that savings on major programs be increased. To that end, the Deputy said the need for and value of a dynamic VE program for contractors must be emphasized to Defense program managers.

In a letter to the Army Commands in October 1975, the Comptroller of the Army noted that many contractors were not convinced that the Army was earnestly soliciting their participation in the VE program and said that Army procurement and technical personnel must intensify their efforts to motivate contractor participation. In a January 1976 letter to the Army Commands, the Acting Comptroller of the Army noted that contractors were particularly sensitive to the expressed desires of program managers and would respond in the areas emphasized by the managers. He said there was an urgent need for personal involvement by Army program managers and appealed to them to take action to improve VE savings performance on their programs.

In October 1976, the Deputy Commanding General for Materiel Development, Army Materiel Development and Readiness Command, stated in a letter to Army project managers that the Army was not near to realizing the full potential for VE savings and would not be until it had full participation in the VE program by all Army project managers.

Over the past 2 years and particularly in late 1976, the Office of the Secretary of Defense issued various communications to the military services which were aimed at reviving the DOD VE program for contractors. In general, these communications called for increased use of the VE program to offset production cost growth on major programs in support of DOD's design-to-cost objectives; encouraged application of the VE program on development contracts; and asked for the establishment of budget procedures and objectives for VE investments on major programs. Also, a change to the Armed Services Procurement Regulation provisions covering VE contract clauses was under consideration in late 1976 and has since been approved. DOD believed the change might facilitate wider use of the VE program on design-to-cost major programs during development by elimination of possible overlap or duplication between design-to-cost target cost incentives and VE contract clause incentives.

However, most of these efforts were initiated too late to have any bearing on fiscal year 1976 savings results, and we foresee no meaningful indication of their actual impact on VE program savings performance until fiscal year 1977 savings are reported later this year.

## CHAPTER 4

### CONCLUSIONS AND RECOMMENDATIONS

#### CONCLUSIONS

We believe that a lack of Defense management acceptance and support has been the basic and most critical factor impeding the performance of the DOD VE program for contractors. Correction of this weakness is the most essential need of the program.

A Value Engineering Congress sponsored by the Air Force Systems Command and composed principally of about 50 representatives from 20 major Defense contractors and a like number of Air Force and other agency representatives reached a similar conclusion early this year. This congress considered the creation of a positive attitude toward the VE program in Defense and contractor organizations to be the program's overriding need.

The problem is not new. The Assistant Secretary of Defense, Installations and Logistics, when commenting on our 1969 report to the Congress on the need for improved management of the DOD VE program, advised us that the major limitation to progress then appeared to be the problem of educating and motivating large numbers of personnel within both DOD and industry. This is still the major problem 8 years later.

To be productive, the program must have strong contractor participation but, when key elements of Defense itself fail to support the program, it cannot be expected that contractors will feel encouraged to participate in it. We believe that strong Defense support must first be established to create an environment conducive to contractor support and participation.

We feel now, as we did in 1969, that the DOD VE program for contractors is a worthwhile concept with the capability for achieving significant savings in the cost of acquiring, operating, and logistically supporting items in the Defense arsenal. DOD analysis of fiscal year 1976 savings indicated that the services were probably getting a return of about 10 to 1 on each dollar directly invested in the program. However, as stated in chapter 2 of this report, the program has not achieved its potential and its productivity has dropped sharply since 1971. Savings in the past 2 years have amounted to less than 20 percent of DOD's assessment of the program's minimum potential.



Without aggressive support from top-level service management--extending down through the ranks of each command to the working-level relationships with contractors--it is unlikely the program will ever approach its full savings potential.

#### RECOMMENDATIONS

In view of the savings dollars at stake, we recommend that the Secretary of Defense institute firm measures to insure that the VE program for contractors will be aggressively supported and actively promoted by all service secretaries and managers. Among the measures that can be taken would be:

- A strong signal from the Secretary of Defense to the service secretaries and managers indicating his personal interest in the program and that he expects them to give the program their full support.
- A requirement that the service secretaries periodically inform the Secretary of Defense of their progress toward improving VE program savings performance in each of the military departments.
- A requirement that the major program managers periodically inform the service secretaries of VE program savings performance on their major weapon systems.
- Providing special recognition for service managers with outstanding VE program savings performance in their areas of responsibility.

In addition, we recommend that the Secretary of Defense inform the Congress of VE program savings results on individual major weapon systems in conjunction with DOD's testimony at Congressional Appropriations Committee hearings on those systems. This would enable the Committees to consider the extent of DOD's VE program cost saving efforts on high-cost major weapon systems in their deliberations.

## CHAPTER 5

### AGENCY COMMENTS AND OUR EVALUATION

We brought our findings, conclusions, and recommendations to the attention of the Secretary of Defense in a June 3, 1977, draft of our report. DOD's letter of September 9, 1977, commenting on our draft report is included as appendix I to this report.

DOD concurred in our recommendation that it should institute firm measures to insure support and promotion of the VE program by the service secretaries and managers. The agency believes that initiatives taken by the Office of the Secretary of Defense in the past year constitute such action. These initiatives are discussed briefly on page 16 of this report.

We agree that the prior initiatives are constructive. But, in view of the extent of the lack of support by top service managers which was evident in our review and the duration of that critical problem, we believe that additional measures, much like those suggested under our recommendation, are needed to achieve the level of support required to stop a continued savings loss of \$200 million a year.

DOD expressed some concern about the method to be used to inform the Congress of VE savings on major weapon systems, but suggested that some derivative of the annual service reports to the Secretary of Defense might be developed for this purpose. We suggest that the Department of Defense discuss the matter with the staffs of the Appropriations Committees to work out an appropriate reporting format. We would be glad to assist in this matter.

In addition, DOD felt we should recognize that 26 out of 45 major programs in advanced development and full-scale development had VE clauses in their contracts, even though the use of the clauses is "optional" in these phases.

We found that the Armed Services Procurement Regulation specifically provides that a VE incentive clause shall be included in advanced and full-scale development contracts, unless it is determined that inclusion of the clause would be in conflict with other contract requirements or that there is minimal potential for savings. Furthermore, the VE program requirement clause is designed primarily for use on full-scale development contracts.

While we do recognize that the 26 programs had VE contract clauses, we think a great deal more can be done, especially when 21 of those programs produced no savings.

DOD informed us that the Army and the Air Force have set goals to increase their overall VE investments 50 and 100 percent, respectively, and to invest an average of \$500,000 on major programs in production. The agency said the Navy will submit its VE improvement plans soon.

Although we have not attempted to analyze the adequacy of the goals, we believe this is a step in the right direction. The actual achievement of investment goals and the maximum savings return on the investments, however, will require sustained aggressive support and promotion of the VE program by all service secretaries and managers.



DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING  
WASHINGTON, D. C. 20301

9 SEP 1977

Mr. R. W. Gutmann  
Director, Procurement and Systems  
Acquisition Division  
U.S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Gutmann:

This is in response to your letter of 3 June 1977 to the Secretary of Defense which forwarded copies of your draft report on "Top Level Management Support Needed for DoD Value Engineering Programs," (OSD Case #4639).

We welcome suggestions to improve the Value Engineering (VE) contract incentive program and have supported the use of VE incentives since 1968. The draft report recognizes many of our initiatives for improvement during the past year.

The report should recognize that even though use of VE clauses is optional in advanced development and full-scale development contracts, twenty-six of forty-five programs in these phases still used the clauses.

While the report cites most of the current Office of the Secretary of Defense initiatives for improvement, it does not cover in any significant detail the Service programs. The Army and Air Force, for example, have set goals to increase overall VE investment 50 and 100 percent respectively and to average one half million dollars investment in VECs on major programs in production. The Navy has agreed to submit their plan for improvement soon.

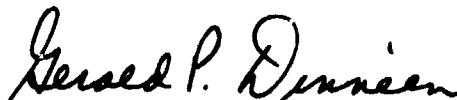
The Office of the Secretary of Defense will monitor these Services initiatives and take action as appropriate.

We concur in the recommendation that the Secretary of Defense take steps to insure aggressive support and active promotion of the Department of Defense VE program. We believe the office of the Secretary of Defense initiatives in the past year constitute such action.



We have some concern about the recommendation that the Secretary of Defense inform Congress of VE savings on major weapons in conjunction with Congressional Appropriations Committee hearings. If the Congress desires VECP data, some derivative of the annual Service reports to the Office of the Secretary of Defense would be more meaningful.

Sincerely,

A handwritten signature in cursive script that reads "Gerald P. Dinneen".

Gerald P. Dinneen  
Principal Deputy

PRINCIPAL OFFICIALS  
RESPONSIBLE FOR ADMINISTERING  
ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
<u>DEPARTMENT OF DEFENSE</u>		
SECRETARY OF DEFENSE:		
Dr. Harold Brown	Jan. 1977	Present
Donald H. Rumsfeld	Nov. 1975	Jan. 1977
James R. Schlesinger	June 1973	Nov. 1975
William P. Clements, Jr. (acting)	Apr. 1973	June 1973
Elliot L. Richardson	Jan. 1973	Apr. 1973
Melvin R. Laird	Jan. 1969	Jan. 1973
ASSISTANT SECRETARY OF DEFENSE (MANPOWER RESERVE AFFAIRS AND LOGISTICS) FORMERLY (INSTALLA- TIONS AND LOGISTICS):		
Dr. John P. White	May 1977	Present
Dale R. Babione (acting)	Jan. 1977	May 1977
Frank A. Shrontz	Feb. 1976	Jan. 1977
John J. Bennett (acting)	Mar. 1975	Feb. 1976
Arthur T. Mendolia	Apr. 1973	Mar. 1975
Hugh McCullough (acting)	Jan. 1973	Apr. 1973
Barry J. Shillito	Jan. 1969	Jan. 1973
<u>DEPARTMENT OF THE ARMY</u>		
SECRETARY OF THE ARMY:		
Clifford L. Alexander, Jr.	Feb. 1977	Present
Martin R. Hoffran	Aug. 1975	Jan. 1977
Howard H. Callaway	July 1973	Aug. 1975
Robert F. Froehlke	July 1971	June 1973
<u>DEPARTMENT OF THE NAVY</u>		
SECRETARY OF THE NAVY:		
W. G. Claytor	Feb. 1977	Present
J. William Middendorf	June 1974	Feb. 1977
John W. Warner	May 1972	June 1974
John H. Chafee	Jan. 1969	May 1972

Tenure of officeFromToDEPARTMENT OF THE AIR FORCE

## SECRETARY OF THE AIR FORCE:

John C. Stetson	Apr. 1977	Present
Thomas C. Reed	Feb. 1976	Apr. 1977
James W. Plummer (acting)	Dec. 1975	Jan. 1976
John L. McLucas	May 1973	Nov. 1975
Robert C. Seamans, Jr.	Jan. 1969	May 1973

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