IDA

INSTITUTE FOR DEFENSE ANALYSES

# Value Engineering and Life-Cycle Sustainment

Jay Mandelbaum
James R. Vickers
Anthony C. Hermes

December 2012



IDA Document D-4710
Log: H 12-001641

INSTITUTE FOR DEFENSE ANALYSES
4850 Mark Center Drive
Alexandria, Virginia 22311-1882

*The Institute for Defense Analyses is a non-profit corporation that operates three federally funded research and development centers to provide objective analyses of national security issues, particularly those requiring scientific and technical expertise, and conduct related research on other national challenges.*

**About This Publication**
This work was conducted by the Institute for Defense Analyses (IDA) under contract DASW01-04-C-0003, Task AU-6-3140, "Value Engineering," for the Office of the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)), Systems Engineering, Mission Assurance. The views, opinions, and findings should not be construed as representing the official position of either the Department of Defense or the sponsoring organization.

**Acknowledgments**
The authors would like to thank Karen Richter, Stan Horowitz, and David Nicholls, the reviewers, and Elisse Barnes, the editor.

INSTITUTE FOR DEFENSE ANALYSES

IDA Document D-4710

# Value Engineering and Life-Cycle Sustainment

Jay Mandelbaum
James R. Vickers
Anthony C. Hermes

# Executive Summary

Value Engineering (VE) is a recognized technique for reducing costs, increasing productivity, and improving quality. It can be applied to hardware and software; development, production, and manufacturing; specifications, standards, contract requirements, and other acquisition program documentation; and facilities design and construction. It may be introduced at any point in the life cycle of products, systems, or processes. VE is used to analyze the functions of an item or process to determine best value, or the best relationship between worth and cost. In other words, best value is represented by an item or process that consistently performs the required basic function for the lowest life-cycle cost.

The Department of Defense (DOD) VE program has two distinct components:

- An in-house effort where VE is performed by DOD military and civilian personnel
- An external effort where VE is performed by DOD contractors and applied to contracts either on a mandatory or voluntary basis after DOD approval of a Value Engineering Change Proposal (VECP)

Largely due to a lack of awareness or training, not all program offices and contracting organizations look favorably on VECPs. In addition, the VECP clauses in the Federal Acquisition Regulation (FAR) are very complex. Based on limited data collected in fiscal years (FY) 2008 through 2010, approximately two thirds of the submitted VECPs were approved. Average processing time was approximately 130 days.

VECPs are extremely rare on service/sustainment contracts. In addition to the issues surrounding their complexity and the lack of awareness and training, calculating how to actually share the savings in service/sustainment contracts is inherently complicated. The challenge in using VE in a service/sustainment environment is that it is more difficult to identify the mechanisms for calculating savings with greater accuracy and sharing savings. Finally, the FAR supply and service contract VECP clause is written from a hardware perspective. It uses terms, such as “quantity” and “unit price,” that do not normally apply in a service/sustainment environment that is traditionally measured in “hours.” A VECP that reduces cost through some productivity change will result in a counterintuitive situation where a higher per hour cost leads to a lower total cost. The bottom-line result is that a proven cost reduction approach is not being considered in more than half of DOD’s contract actions.

Competition or the lack thereof, affects DOD’s cost on sustainment contracts. Competition drives cost down. Therefore, to some extent, the opportunity to lower cost from VECPs, or any other cost savings initiative for that matter, is reduced. That does not however imply that the

additional savings potential is negligible. Furthermore, because of the fear of disruption and startup costs, there have been situations with little competition in service contracts once the initial award was made. VECPs provide incentives for the contractor to make changes that save the customer money.

VECPs on sustainment contracts could lead to several changes. Repair processes could be improved by reducing the cost of labor and/or material. The reliability of the item itself could be improved so that fewer repairs would be needed. In addition, a requirement on the turnaround time to complete the repair that has a major impact on cost could be changed, as long as the customer's needs are met. In a similar vein, contractor's costs associated with sustaining functions indirectly related to the hardware repair, (e.g., safety, configuration management, obsolescence management, etc.) that are driven by other contract requirements could be reexamined and reduced.

This document describes plausible business case considerations for DOD contractors to submit VECPs based on tradeoffs between revenue and profit that even apply to fixed price contracts with no competition because the contractor may not be able to keep all the savings if DOD decides to renegotiate the contract. This document also identifies other benefits to the contractor including capturing follow-on work, improving its reputation, obtaining good recommendations, reducing risk and the potential for losses, incorporating new technology to increase profit or competitiveness, and reducing less desirable work. Furthermore, this document points out places in common contractor processes where VECPs should be considered to challenge requirement, reduce risk, and capitalize on opportunities. These processes include program start-up reviews, budget reviews, risk reviews, and technology benchmarking.

DOD leadership has given direction to use VE to pursue Better Buying Power 2.0 initiatives to control costs throughout the product life cycle and to provide incentives to industry so that they are as cost effective as possible in achieving the Department's goals. To comply with this direction, actions must be taken to change the current situation by removing the barriers to VECPs.

- A training and awareness campaign should be conducted to initiate a change to the culture of program offices and contracting organizations that inhibit contractors from submitting VECPs.
- The FAR should be modified to include a clause for service contracts and guidance developed to (1) identify the mechanisms for sharing and calculating savings with increased accuracy and (2) simplify VECP definitization and settlement when there are many contract line items for doing the same thing.
- DOD should add a mandatory VECP clause to direct the contractor to look for cost savings on sustainment contracts that have little incentive for the contractor to improve cost because of the infeasibility of competition (e.g., long term sole source fixed price

contracts or long term fixed price contracts with more than several years after a competitive award).

# Contents



# Appendices

# 1. Introduction

Value Engineering (VE) is a recognized technique for reducing costs, increasing productivity, and improving quality. It can be applied to hardware, software, and services; development, production, and manufacturing; specifications, standards, contract requirements, and other acquisition program documentation; and facilities design and construction. It may be introduced at any point in the life cycle of products, systems, or processes. VE is used to analyze the functions of an item or process to determine best value, or the best relationship between worth and cost. In other words, best value is represented by an item or process that consistently performs the required basic function for the lowest life-cycle cost.

In an effort to provide better value for the taxpayer and the warfighter, the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) signed a memorandum for acquisition professionals that provided specific guidance for improving the way the Department of Defense (DOD) does business. The memorandum identified five broad areas of initiatives:[1]

- Achieve affordable programs
- Control costs throughout the product life cycle
- Incentivize productivity and innovation in industry and government
- Eliminate unnecessary processes and bureaucracy
- Promote effective competition
- Improve tradecraft in acquisition of services
- Improve the professionalism of the total acquisition workforce

There has been a great deal of DOD leadership interest in VE associated with these initiatives. Based on a predecessor (but similar) version, the USD(AT&L) has stated that:[2]

> … The Department will obtain greater efficiency and productivity in its spending by continuing to pursue Better Buying Power initiatives like Value Engineering. Increased usage of VE is a vehicle to enable greater success in pursuing these initiatives on acquisition programs. … The Department's fiscal environment

[1] Under Secretary of Defense (Acquisition, Technology and Logistics (USD(AT&L)), "Subject: Better Buying Power 2.0: Continuing the Pursuit for Greater Efficiency and Productivity in Defense Spending," memorandum (Washington, DC: Department of Defense (DOD), November 13, 2012).

[2] USD(AT&L), "Subject: Better Buying Power Guidance for Obtaining Greater Efficiency and Productivity in Defense Spending," memorandum (Washington, DC: DOD, September 14, 2010).

> demands that you make every effort to reduce the cost of the products and services we acquire.[3]

Changes are also underway in VE policy. Public Law 111-350, Section 1711 on Value Engineering states:

> Each executive agency shall establish and maintain cost-effective procedures and processes for analyzing the functions of a program, project, system, product, item of equipment, building, facility, service, or supply of the agency. The analysis shall be—
>
> 1) performed by qualified agency or contractor personnel; and
>
> 2) directed at improving performance, reliability, quality, safety, and life cycle costs.[4]

This law is implemented by Office of Management and Budget Circular A-131, which is being updated.[5] A new DOD Instruction on VE has also been signed, making A-131 requirements official DOD policy.[6]

The DOD VE program has two distinct components:

- An in-house effort where VE is performed by DOD military and civilian personnel
- An external effort where VE is performed by DOD contractors and applied to contracts either on a mandatory basis or on a voluntary basis after DOD approval

The mandatory VE effort by the contractor uses the VE Program Requirement (VEPR) clause that may be included in contracts if the contracting officer determines that significant savings may result from a sustained, specified VE effort. Typically, solicitations and contracts employing a VEPR include a Statement of Work, a Contract Data Requirements List (CDRL) requirement to submit Value Engineering Change Proposals (VECP), and a separate Contract Line Item. The VEPR clause can be used as a risk-sharing mechanism where the parties to the contract may agree to share development costs. Unfortunately, the use of the VEPR has declined in DOD.

Applying the voluntary contractor component to sustainment contracts is the principal subject of this document. With few exceptions, it is a requirement to include voluntary VE provisions in most DOD contracts to encourage contractor participation and thereby realize the

3 USD(AT&L), "Subject: Value Engineering (VE) and Obtaining Greater Efficiency and Productivity in Defense Spending," memorandum (Washington, DC: Department of Defense, December 6, 2011).

4 "Value Engineering," Section 1711, "Public Contracts," Title 41, U.S. Code, Public Law 111-350, 111th Congress (Washington, DC: U.S. Government Printing Office, January 4, 2011).

5 "Value Engineering," OMB Circular No. 131 (Washington, DC: Office of Management and Budget, White House, May 21, 1993).

6 DOD, "DOD Value Engineering (VE) Program," DOD Instruction 4245.14 (Washington, DC: DOD, October 26, 2012).

full benefits from cost reduction opportunities and innovations. These contract provisions provide the basis for the contractor to obtain a share of the savings that result from an approved VE effort.

The attractiveness of this incentive to both DOD and contractors is significant. Without it, from a contractor's perspective, submitting a cost-reduction change would lead to a commensurate reduction in the size of the contract and, usually, profits by a proportional amount. There is no reason for the contractor to submit a cost reduction unless the contractor has an incentive to achieve a target cost. From a DOD perspective, the unit cost it pays would never be reduced below a contractually established target. The VE provisions change this paradigm by providing the contractor with an incentive to submit VECPs to reduce cost.

Encouraging VECP-like efforts is explicitly included in the Better Buying Power 2.0 Initiatives. The first initiative under incentivizing productivity and innovation in industry is as follows: "Align profitability more tightly with Department goals: The Department will reassess how it provides incentives to industry so that they are as cost effective as possible at achieving the Department's goals…"[7]

This document is organized as follows: Chapter 2 examines overall contracting trends and points out the characteristics of sustainment contracts in DOD today. VECP settlement alternatives are discussed in Chapter 3. Based on inferences from actual sustainment contracts in force today, Chapter 4 shows opportunities for VECPs on sustainment contracts as a function of the contract characteristics and settlement options by describing the business case for them. Chapter 5 lists activities used to determine risks and opportunities on contracts and explains how VE can be used to mitigate risks and capitalize on opportunities. Chapter 6 is a brief conclusion.

[7] USD(AT&L), "Subject: Better Buying Power 2.0: Continuing the Pursuit for Greater Efficiency and Productivity in Defense Spending," memorandum (Washington, DC: DOD, November 13, 2012).

# 2. Characteristics of Sustainment Contracts in the Department of Defense (DOD)

Contracts for services are an important part of DOD expenditures. Table 1 shows the value (in then-year billions of dollars ($B)) of total and services-only DOD contract actions by fiscal year (FY). A contract action could either be the award or modification of a contract. Services represent approximately half of the dollar value of all contract actions; there are no clear trends in the ratio of these two figures.

**Table 1. Service Contract Actions in DOD**

| Contract Actions | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|---|---|
| Total DOD ($B) | 300.4 | 340.3 | 397.2 | 397.2 | 367.8 | 373.7 |
| Service only ($B) | 151.8 | 169.7 | 193.5 | 184.4 | 191.2 | 189.0 |
| Ratio of services to total (%) | 50.5 | 49.9 | 48.7 | 46.4 | 52.0 | 50.6 |

Source: *Federal Procurement Data System (FPDS) Extract*, January 2012

The following sections qualitatively discuss trends for service; and by implication sustainment contracts since sustainment contracts are an important element of service contracts. Some Federal Procurement Data System (FPDS) contract action data is used to support these trends.[8] One type of contract captured in FPDS was labeled "combination." Contracting officers could use that category when more than one type of contract was included for a contract action. Contracts actions also often contain different line items with different forms of payment (e.g., cost reimbursable and fixed price) which is discussed later in this document. Typically one is predominant. Before October 1, 2009, contracting officers were allowed to use the combination label, without clear guidance on when to use it. After October 1, 2009, the combination category was no longer allowed on new awards. The large dollar values in the combination field, especially in FY 2007, 2008 and 2009, ($15.3B, $22.9B, and $29.3B respectively), inhibit the formulation of definitive conclusions from the FPDS information.

## A. Overall Trends

In the past, DOD operated and managed many of its own depots and bases, predominantly using military personnel and civilian employees to provide services. At that time, most

[8] Sustainment contracts cannot be uniquely identified in FPDS.

contracting was for materials and unique services (including more technical logistics support functions where DOD had limited expertise).

When limits were placed on the number of both military and civilian personnel, DOD began to also contract for more basic services, such as janitorial, messing, and guard services. These services were normally contracted using time and materials (T&M) or fixed price contracts since the effort was fairly well defined. On T&M contracts, DOD would pay fixed per hour labor rates (including overhead and profit) and for materials at cost. With the exception of some of the unique or highly technical efforts, most of these contracts for services were awarded competitively. DOD still retained responsibility to manage the overall work on its bases and depots.

Eventually, further budget pressures and/or the need to deploy forces caused DOD to contract for the entire operation of a base or depot and a greater percentage of the logistics support services. Because of the uncertainty of the effort involved, such contracting was originally done on a cost plus fixed fee (CPFF) basis, where the contractor was reimbursed for its costs and was paid a fixed fee for completion of the effort. In some cases, contracting on a CPFF basis was less than optimal because the contractor was paid a fee regardless of how well the work was performed. The contractor also had no incentive to reduce DOD costs.

Table 2 shows two types of contracts: paid by the hour and fixed price service contract actions without cost-based incentives as a percent of total service contract actions. The "paid by the hour" line includes time and material, CPFF, labor hour, fixed price level of effort, and cost no fee types of contracts as identified in the FPDS. Fixed price level of effort is included under paid by the hour because payment is made on the basis of a fixed number of hours. Including the fixed price does not distort the trends because the values associated with these contract actions are always less than 0.5 percent. The fixed price line includes firm fixed price, fixed price, fixed price with economic price adjustment,[9] fixed price award fee, fixed price incentive fee, and fixed price redetermination[10] contract actions from the FPDS. The incentives for fixed price award and incentive fee contracts are based on how well the contractor performs the work; they are not cost-based.

[9] Fixed price with economic price adjustment is a fixed price contract where one or more elements of cost are subject to escalation. Consider titanium as an example. If its price varied by some percentage from its baseline, the price of the contract would be adjusted to reflect the difference between the price assumed for the bid and the price actually paid.

[10] Fixed price redetermination is a fixed price contract whose value is redetermined after some elements become definitized.

**Table 2. Service Contract Actions in DOD without Cost-Based Incentives**

| Type of Contract | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|---|---|
| Paid by the hour (%) | 27.8 | 26.3 | 25.2 | 30.3 | 29.6 | 30.2 |
| Fixed price (%) | 40.1 | 35.5 | 43.0 | 35.8 | 45.7 | 47.6 |

Source: *Federal Procurement Data System (FPDS) Extract*, January 2012

Table 2 shows a slight upward trend for both types of contracts. For paid by the hour contracts, the trend is driven primarily by increases in CPFF actions. There has also been a smaller increase in cost no fee contracts. The use of time and materials contracts has dropped. The trend in fixed price contracts is driven entirely by trends for firm fixed price and fixed price contract types in FPDS. Use of the other types of contracts included in this line is very small.

When fixed price contracts were not feasible, DOD used cost-based incentive contracts to encourage the contractor to reduce cost. In Cost Plus Award Fee (CPAF) contracts, the contractor is paid a fee based on performance in several areas, including cost, quality, responsiveness, and customer satisfaction. Award fee pools of money are set aside for various performance periods and DOD unilaterally determines how much of the award fee a contractor earns. While award fee criteria are provided to the contractor prior to the start of an award fee period, they are usually rather general and allow DOD to make a subjective evaluation of the contractor's performance. CPAF contracts also allow DOD to recognize changed circumstances and award contractors a large portion of the award fee pool for good performance even though it did not meet the stated award fee criteria. In situations where good incentive criteria are difficult to verbalize and/or changing, this feature led to the increased use of award fee pools in fixed price contracts for services.

Unfortunately, award fee contracts have come into disfavor in recent years. DOD leadership and Congress have been critical of them on major defense acquisition and lead system integrator contracts, where the systems did not work as promised and/or the program was severely overrun, yet the contractors earned nearly all the available award fee. Recent restrictions have limited their use by allowing payment of the award fee only if there was satisfactory performance and greatly restricted base fees and roll-overs of unearned award fee available in one period to a future period.[11] Loss of the ability to roll over the unearned award fee is particularly troubling for service contracts because of a high likelihood of changes in the work timing.

In some circumstances, Cost Plus Incentive Fee (CPIF) contracts were used to overcome these limitations. Under CPIF contracts, a contractor is paid an incentive fee if certain performance criteria are exceeded and/or if the effort is completed under the negotiated target cost. However determining the performance criteria was difficult because of the changing and

[11] "Cost Reimbursement Incentive Contracts," Subpart 216, Section 216.405, *Defense Federal Acquisition Regulation Supplement (DFARS)* (Washington, DC: Department of Defense, September 16, 2011).

unpredictable nature of the services. Additionally, the contractor often had little control over the costs because of changing circumstances or requirements.

Table 3 shows FPDS trends for CPIF and CPAF contracts. There has been an increase in CPIF contract actions in the last two years. Trends in CPAF contract actions are down.

**Table 3. Service Contract Actions in DOD with Cost-Based Incentives**

| Type of Contract | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|---|---|
| CPIF (%) | 6.5 | 6.7 | 5.3 | 5.5 | 7.8 | 8.2 |
| CPAF (%) | 22.1 | 22.3 | 13.2 | 11.3 | 14.2 | 11.8 |

Source: *Federal Procurement Data System (FPDS) Extract*, January 2012

## B. Performance-based Contracts

In the mid-1990s, DOD's Acquisition Reform Office began to develop initiatives using another contracting approach applicable to acquiring services that emphasized the commercial best practice of performance-based contracting. These contracts specified the desired outcome while the contractor was responsible for determining the means to achieve that result. The belief was that costs would be reduced by giving contractors control over how they achieved a given outcome.

There was a lot of interest in using this performance-based approach for logistics support because of its success in the airline industry. Typically performance-based logistics (PBL) contracts have extremely detailed criteria to assure that the desired level of performance is achieved. These criteria would use metrics such as average turnaround time, inventory levels, or the percentage of time a part was not available when needed. Other responsibilities, such as protecting against parts obsolescence and management of DOD owned inventory, are also left to the contractor. Since the detailed performance measurements initially require a large effort to establish, they are often put into templates and reused by various buying commands that do not want to have to "reinvent the wheel."[12]

The approach used for PBL contracts also was designed to reduce DOD's role in oversight and shift more risk to the contractor. The administration of such contracts is much simpler because DOD is not involved in monitoring the method the contractor uses to accomplish the work. Of course, metrics to demonstrate that performance is adequate have to be agreed upon and monitored. But once these metrics are established, their monitoring involves less effort than assuring performance in a prescribed manner.

[12] PBL contracts are very complex. An enormous amount of work is required to build a contract without using these templates.

The details of such contracts are usually negotiated after an initial cost plus effort (or at least a renegotiable effort) is completed to establish a baseline. Once a baseline is set, most of the effort is fixed price with terms making the price subject to adjustment if quantities differ by more than a set amount, e.g., +/- 10 percent. Additionally, there may be incentives, both positive, like an award fee, and negative, like a price reduction, to ensure performance goals are met and perhaps exceeded. PBL contracts typically have three to five option years associated with them.

Table 4 shows FPDS trends in performance-based contract actions. By FPDS rules, a contract must be 80 percent performance-based to be classified in that category. The first line is the total value of the performance-based contract actions in then-year billion dollars. The second line shows the percentage of all contract actions that are performance-based and shows an upward trend. The majority of the performance-based contract actions are for services.

**Table 4. Performance Based Contract Actions in DOD**

| Performance Based Contract Actions | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---|---|---|---|---|---|---|
| Total value ($B) | 65.6 | 46.7 | 54.6 | 66.7 | 94.7 | 108.9 |
| Ratio to all contract actions (%) | 21.8 | 13.7 | 13.7 | 16.8 | 25.7 | 29.1 |

Source: *Federal Procurement Data System (FPDS) Extract*, January 2012

Recent years have shown a small increase in fixed price performance-based contract actions in FPDS. Cost-based contracts have been stable for the last five years. In that time, CPAF and CPIF have declined while CPFF has increased.

There have been some indications, however, that DOD is becoming less of an advocate for PBL. One is that DOD wanted to bring back some of the control it had so it could pursue other objectives, such as being better able to use resources it was spending for PBL on related things like system modifications. Another is the cost. Since the contractor was taking on the responsibility for the entire operation, the price had to take the associated risk into account. DOD believed it was in a better position to absorb this risk.

A hybrid approach for sustainment contracts is emerging. This approach includes an overarching contract, which could be CPAF, and numerous firm fixed price and cost reimbursable line items for various tasks. The cost reimbursable line items may be CPFF, CPIF, or even T&M. These fixed price tasks would be subject to adjustment if major changes occurred, such as the contractor receiving 25 percent more or less than the work originally projected, but such adjustments would be rare.

After reviewing a series of large sustainment contracts from multiple Air Force and Navy buying offices, it appears that they lack incentives for contractors to reduce the cost to the customer. This is especially troubling because many of these contracts are long term (some

greater than twenty years). One way, and currently virtually the only way, a contractor can profit through changes to these contracts that save the customer money is through VECPs.

# 3. Value Engineering Change Proposals (VECP)

## A. Settlement Options

A VECP is a proposal submitted to DOD by the contractor in accordance with the VE clause in the contract.[13] It proposes a change to the contract that, if accepted and implemented, eventually provides an overall cost savings to DOD. A VECP may update an existing design to the current state-of-the-art technology, simplify complex material by modifying or eliminating components, amend specifications/drawings to provide improved data for future procurements, or reduce CDRL items, to name a few examples. Despite the term *value engineering*, no engineering effort is required; only a proposal that reduces the cost of performance under the contract and requires a contract change for implementation. The VE provisions in a contract prescribe that the contractor receives a substantial share in the savings accrued for implementing the change.

A VECP does not require a change in a specification; it requires only a change in the contract. In order to qualify as a VECP and to ensure that savings can be shared, the proposed change must be submitted under a current contract and must meet two primary requirements:

- It must require a change to the contract under which it is submitted.
- It must reduce cost to DOD after being accepted and implemented.

Acquisition and collateral savings are two basic types of savings that can be shared when a VECP is approved and implemented under a contract for supplies or services. Sharing arrangements vary with other types of contracts. Federal Acquisition Regulation (FAR) Parts 48 and 52.248-1[14] define the terms used in VE, the criteria for VECP acceptance, and cost savings sharing arrangements. In addition, incentive contracts may contain special provisions that ensure no adjustments are made to targets or ceilings when an approved VECP results in instant contract VECP savings awarded under the overall contract cost incentive. Whatever the type of contract, it is DOD's intent to offer a full range of motivational VE options to contractors while precluding duplication of incentives.

The FAR defines "acquisition savings" as "...savings resulting from the application of a VECP to contracts awarded by the same contracting office or its successor for essentially the

[13] The material in this section was extracted from the *Department of Defense Contractor's Guide to Value Engineering*, Version 2.4 (Washington, DC: Office of the Undersecretary of Defense for Acquisition, Defense and Logistics, August 2011).

[14] Part 48 and Part 52.248-1, "Value Engineering," Federal Acquisition Regulation (FAR), Vol. I (Washington, DC: U.S. General Services Administration, March 2005).

same unit." Acquisition savings may include savings obtained on the instant contract, concurrent contracts, and future contracts.

An instant contract is the contract under which the VECP is submitted. If the VECP is accepted and implemented on items delivered under this contract, the contractor will receive a percentage share of the net savings that accrue as a result of the VECP. The contractor's costs (and subcontractor's, if applicable) to develop and implement the VECP and DOD's implementation costs are all considered when calculating savings. The contractor's development costs are costs incurred in developing, testing, preparing, and submitting the VECP. Development costs materialize after it has been determined that a VECP will be prepared and before acceptance of the VECP by DOD. Implementation costs are costs resulting from contractual changes required as a result of DOD acceptance of the VECP. Implementation costs materialize after the VECP has been approved. It includes any subcontractor's allowable development and implementation costs and any value engineering incentive payments to a subcontractor that clearly result from a VECP accepted by DOD under the contract. The contractor may choose any arrangement for subcontractor VE incentive payments provided that the payments do not reduce DOD's share of concurrent or future contract savings or collateral savings. The arrangements negotiated for the instant contract are continued in future contracts, including any negative instant contract savings for the contractor submitting the VECP to DOD.

Concurrent contracts are contracts that the VECP originator (referred to as Contractor A) and other contractors (Contractors B, C, etc.) have for essentially the same item. If DOD incorporates Contractor A's VECP into Contractor B or C's contract, then Contractor A will receive a share of the net savings that are obtained by Contractors B or C (i.e., any contract affected by Contractor A's VECP). Contractor A's instant contract total price will then be increased by that amount.

Acquisition savings can be shared in one of three ways. If DOD can predict with some degree of certainty the number of affected items to be procured within the share period (and this number is not classified), the lump-sum method of settlement can be used if the contractor and the contracting officer agree. The contract modification incorporating the VECP will specify the anticipated future procurement quantity. The cost savings per unit are then multiplied by the anticipated share period quantity, and the instant contract price is increased by the contractor's share of that amount.

The primary way to share future savings is for the contractor to receive a portion of the per-unit savings that occur as contracts incorporating the VECP are awarded. This sharing applies to items scheduled for delivery within the determined share period (as described in the FAR), which begins upon acceptance of the first item affected by the VECP. In the case of multi-year contracts, sharing applies only to quantities that (1) are fully funded at the time of VECP acceptance, and (2) fall within the determined share period. It is the contractor's responsibility to maintain records from the time the first VECP-affected unit is accepted until the determined VECP share period ends. Whenever DOD issues a new contract during this share period for

essentially the same item, and the contractor's VECP has been incorporated into the contract documents, the contractor is entitled to a portion of any per-unit savings occurring during the share period. Payment will be made via the instant contract when savings are realized. Normally, the savings per unit that were calculated for the original contract will be multiplied by the number of units scheduled for delivery prior to the expiration of the share period. Also, in design or low rate initial production contracts, DOD may modify the usual VE clause to improve contractor incentives. If the clause is so modified, the sharing formula is expressed in terms of a specific quantity and not in time. This quantity is the number of units affected by the VECP that are scheduled to be delivered over a period between thirty-six and sixty consecutive months (set at the discretion of the contracting officer for each VECP as described in the FAR) that span the highest planned production, based on planning and programming or production documentation existing at the time the VECP is accepted.

The third way of sharing savings with the contractor is the no-cost settlement method. Under this method, the contractor keeps all savings from the instant contract and concurrent contracts. DOD keeps all savings from future contracts and concurrent contracts with other sources, as well as all collateral savings. This method, if agreed upon by both DOD and the contractor, can minimize the administrative costs of determining and negotiating savings. It should also be noted that if the lump-sum method or the no-cost settlement method cannot be mutually agreed upon, then the future per-unit-savings method will be used.

Collateral savings are the measurable net reductions in costs of operation, maintenance, logistics support, shipping, or DOD-furnished equipment that result from an accepted VECP. In some situations, a VECP might increase the acquisition cost of an item but result in substantial collateral savings. For collateral savings, the contractor is entitled to 20 to 100 percent (determined by the contracting officer as described in the FAR) of the savings that DOD estimates will be realized during a typical one-year period. However, the contractor's share shall not exceed $100,000 or the value of the instant contract, whichever is greater. DOD determines the amount of collateral savings.

## B. Difficulties

It is sometimes difficult for DOD to determine and verify measurable net reductions and pay the collateral savings to the contractor. Typically, collateral savings are from another contract that is not associated with the contracting officer preparing the VECP. Also the "color of money" is sometimes different—procurement appropriations will be used on the current contract while operations and maintenance appropriations are more applicable to the collateral contract. Some of these issues may be overcome if program offices have life-cycle funds responsibility for the system.

Not all program offices and contracting organizations look favorably on VECPs. Much of this is from a lack of awareness or training. The VECP clauses in the FAR are very complex. Based on limited data collected in FY 2008 through FY 2010, approximately two thirds of the

submitted VECPs were approved. [15] Average processing time was approximately 130 days. However, many contractors believe the average period of time is much longer and acceptance is also uncertain. These issues should be mitigated somewhat with greater leadership emphasis in the contracting community to (1) ensure contracting officers are trained in using the VECP clause and (2) encourage contracting officers to be more accepting of VECPs.

VECPs are extremely rare on service/sustainment contracts. In addition to the above issues, these contracts present some inherent complexities in calculating how to actually share the savings. The problem with using VE in a service/sustainment environment is that it is more difficult to identify the mechanisms for sharing savings and calculate savings with increased accuracy. Finally, the FAR supply and service contract VECP clause is written from a hardware perspective. It uses terms such as "quantity" and "unit price" which do not normally apply in a service/sustainment environment that usually focuses on "hours." A VECP that reduces cost through some productivity change will result in a counterintuitive situation where a higher per hour cost leads to a lower total cost. The bottom-line result is that more than half of DOD contract actions are not being considered for the application of a proven cost reduction approach.

## C. An Alternative

In a contract for managing and operating a test site facility, the Department of Energy's National Nuclear Security Administration tried to circumvent some of these issues by adding the following requirements to cost reduction proposals (CRP) submitted to the contracting officer.[16] CRPs were required to contain:

- A verifiable description of the current scope of work, cost, and schedule to be impacted by the initiative, and supporting documentation
- A verifiable description of the new scope of work, cost, and schedule, how the initiative will be accomplished, and supporting documentation
- A description and evaluation of the proposed initiative and benefits, risks, and impacts of implementation
- A discussion of the impact of the CRP on such factors as health and safety, personnel, requirements, and the cost, schedule, and performance of other work

With these requirements, the mechanisms for calculating and sharing the savings are clear. Accepted CRPs result in negotiated shares of the savings for the contractor, the government as a whole, and the site that may be used for specified activities consistent with the terms and conditions of the current contract.

[15] There was incomplete reporting and the linkage of approvals to receipts is inaccurate because only receipts are linked to the fiscal year. Approvals in a given fiscal year may be for receipts in the prior year.

[16] Contract No. DE-AC52-06NA25946 updated to include modifications through 139.

The contracting officer must certify the amount of savings generated. Savings that are intangible or difficult to measure cannot be shared. Similarly, savings that result from a change in contract scope, a change in contract requirements, or a government reorganization do not apply. Only savings that lead to the permanent reduction of recurring costs as a result of a product or process improvement initiated by the contractor qualify for sharing.

# 4. Rationale for VECPs on Sustainment Contracts

Competition, or the lack thereof, affects DOD's cost on sustainment contracts. Competition drives cost down. Therefore, to some extent, the opportunity to lower cost from VECPs, or any other cost savings initiative for that matter, is reduced. That does not however imply that the additional savings potential is negligible. Furthermore, because of the fear of disruption and startup costs, there have been situations with little competition in service contracts once the initial award was made. VECPs provide incentives for the contractor to make changes that save the customer money.

VECPs on sustainment contracts could propose several types of changes. Repair processes could be improved by reducing the cost of labor and/or material. The reliability of the item itself could be improved such that fewer repairs would be needed. In addition, a requirement on the turnaround time to complete a repair that has a major impact on cost could be changed, as long as the customer's needs are met. In a similar vein, contractors' costs that are driven by other contract requirements and associated with sustaining functions indirectly related to hardware repair, (e.g., safety, configuration management, obsolescence management, etc.) could be reexamined and reduced.[17] The following two sections apply to submitting VECPs in any of these situations.

## A. Financial Rationale

Tradeoffs between revenue and profit are central to a contractor's decision to propose VECPs on sustainment contracts. An accepted VECP will reduce contractor revenue. From a contractor's perspective the key question is whether the additional profit generated from the VECP has more value than the lost revenue for both the instant contract and future contracts where VE savings would be shared.

The contractor's tradeoff analysis should take the source of lost revenue into account. For a major prime contractor, the overhead associated with an hour of direct labor is often significantly more than the cost of the direct labor. A large part of this overhead is fixed, in that it does not vary with the direct labor associated with it, such as the cost of indirect management or required functions like human resources or security. The allocated cost of these fixed overhead expenses is based on an estimate of the number of direct labor hours the contractor expects to bill in a year. If the contractor does not incur as much direct labor as predicted in a year, the overhead is under absorbed, resulting in some combination of two unfavorable results: (1) an increased

[17] These types of cost may be even greater than the hardware repair costs.

allocation rate to other contracts (only feasible for cost reimbursable contracts) or (2) paying the shortfall out of profits. If the lost revenue occurs because of reducing material cost, the tradeoff is much simpler because the burden on material is much less.

The contractor's tradeoff analysis should also consider when to submit a VECP—there must be sufficient time remaining to assure a return on investment (ROI). Submitting a VECP early in the contract period is always preferable; a contractor might delay the VECP if a new contract award is close. If there is competition, the contractor may be concerned about passing the savings to a competitor. Without competition, the contractor may be concerned with DOD acting as if the VECP is approved before settlement options have been negotiated. DOD might take all of the savings out of the new contract, and the contractor would be forced to work under an unapproved configuration. In all cases, the length of the current contract and future contracts must be sufficient to generate an adequate return on investment. In a competitive environment or an environment where DOD is making repairs for foreign customers, there is greater uncertainty about future contracts.

This discussion of tradeoffs between revenue and profit works best when there is only a single contract line item involved. If there are many contract line items to do the same thing because of multiple funding sources or different colors of money, the definitizing and settlement of the VECP becomes so complex that the contractor would be unlikely to submit the VECP regardless of the benefits.

In all instances, DOD would want the change made since one requirement for a VECP is that it saves the government money. The following two subsections on cost reimbursable and fixed price contract line items describe *additional considerations* when making cost/revenue tradeoffs, assuming the contractor has developed an idea for reducing costs and has a high degree of certainty that the idea will be effective.

### 1. Cost Reimbursable Contract Line Items

In the absence of contract incentives, the contractor would normally not make a cost reducing change without a VECP, since the result would be only lower revenue, regardless of whether the contractor has the authority to make the change unilaterally.

If there is an incentive fee and a target cost, the tradeoff analysis should take additional factors into account. With this incentive arrangement, reducing cost will affect the fee depending on the difference between the target cost and the actual cost. Reducing actual cost increases the fee up to the contract ceiling for the incentive fee. On cost plus incentive fee (CPIF) contracts, where the incentive is based on a target cost and fee, the contractor's share of VE savings will be realized through the incentive arrangement for the instant contract where the VECP was

definitized.[18] For example, if the contractor receives a 10 percent share of any under run, and the VECP generated a 20 percent total savings, there would be a 2 percent[19] profit from the VE savings through the cost incentive on the contract. However, if the contractor overran the instant contract for any reason (which may not be related to the VE effort), there may be no incentive for the VE effort on the instant contract. In all circumstances, if there is a per unit cost savings from the VECP, the contractor would be entitled to share it on future contracts incorporating the VECP.

If the contractor needs DOD's permission to make the change, the business case should consider that the change in fee will be the greater of the VECP change or target cost incentive change. If the contractor can make the change without permission, it may appear that taking the incentive fee without submitting a VECP is the best course of action. However, especially early in the contract, the contractor may be concerned with unforeseen circumstances that will affect the incentive fee. By using a VECP, the contractor can lock-in the savings and resulting incentive, thereby reducing the downside risk, assuming the VECP was accepted.

If there is an incentive fee for improving performance (e.g., availability), the contract is typically written with the fee as a function of performance. If a VECP both reduces cost and improves performance, the FAR prohibits the contractor from being rewarded twice for the same change as was the case for cost-based incentives. This tradeoff analysis is therefore exactly analogous to the one for an incentive fee with a target cost.

If there is a cost-based award fee, sharing the savings on future contracts and the subjective nature of the award fee are two factors to consider. If the contractor has a high degree of confidence in receiving the entire award fee, then the business case involves only the revenue/profit tradeoff on future contracts as described above, and the contractor would not make the change without a VECP. If there is uncertainty about the award fee, the business case should consider both future contracts and how much additional award fee the VECP might generate above the VECP share in savings.

There are factors that make VECPs more attractive on cost reimbursable contract line item numbers (CLIN) as compared to fixed price CLINs.

- DOD only pays the contractor's actual costs. Therefore, if the contractor develops a cost saving idea that can be used on the instant contract; all savings go to DOD without a VECP.[20]

[18] The first year a VECP is in effect on a cost plus incentive contract or a fixed price incentive contract, the negotiated VECP share of the savings per FAR 48.104-1 does not apply. Shared savings only apply to future contracts.

[19] Ten percent of twenty percent is two percent.

[20] On a fixed price CLIN, the contractor would keep the savings.

- It is usually easier for DOD to change the scope of a cost reimbursable contract because the scope change would only encompass adding a task for the purpose of reducing the cost of the contract. On a fixed price contract, there would have to be negotiations on the price of the extra effort.
- It is much easier for DOD to recognize "negative instant contract savings" to deal with situations where the contractor needs future contracts to realize an adequate return on investment because cost reimbursable contracts are often incrementally funded and another increment can be added more easily.
- The contractor gains the opportunity to share in future contract savings with much less risk because the contractor would be spending DOD's money to make the change.

**2. Fixed Price Contract Line Items**

Regardless of the incentive structure, without competition, the contractor may assume that it can make a change and keep all of the savings indefinitely, and this assumption may have a high probability of being true. However, a large non-recurring engineering (NRE) outlay will extend the breakeven point and reduce the ROI to a point where the contractor may decide not to make the change because DOD may renegotiate the contract on the basis of lower cost figures before the contractor has recouped the investment. DOD does not renegotiate a single CLIN, however if DOD perceived that the reduction in volume was significant and across the board, it could renegotiate the entire contract.

With competition, the considerations discussed under cost reimbursable CLINs apply. Additional factors affecting the business case with and without VECPs are described below.

If there is an incentive fee for improving performance (e.g., availability) or a negative incentive for missing a performance target, and the VECP change reduces cost but does not affect performance, the tradeoff analysis considerations for the cost reimbursable incentive fee case apply. A key difference is that the contractor would not lose revenue if the change were made without a VECP.

In the absence of contract incentives, if the contractor were able to make the change without DOD permission, the contractor would make the change if the non-recurring cost to implement the change was small and an acceptable return on investment was anticipated. Similar to the situation without competition, the contractor could receive benefits over all remaining options of the contract if DOD never renegotiated the price before awarding an option. However, the risk of renegotiation of the entire contract remains.

If the NRE costs are large, the VECP option for DOD and the contractor to share savings for three or more years, after recovering any non-recurring costs, could create a win-win situation because (1) DOD gets the benefit of a lower price; (2) the NRE is reimbursed to the contractor; and (3) the contractor shares in future savings. The contractor would need to make the business case calculations to determine the best approach.

There are other circumstances where a VECP could be beneficial for the contractor. If the VECP change would improve reliability under a PBL contract, there could be a CLIN requiring that the repair of all items (of a specific type) be completed within an explicit amount of time. The fixed price for that CLIN would be based on data that showed the average number and type of repairs expected during a certain period of time. Since the assumptions underlying the fixed price could change, protection for DOD and the contractor is usually built into the contract. For example, if the number of repairs would differ from the expected value by more than 10 percent, the CLIN price could be renegotiated.

Without VECPs, there may be a disincentive for a contractor to improve its method of repair or improve the reliability of the item because of the thresholds for renegotiating fixed price PBL contracts if the volume of repair is substantially different than expected. Assume a contractor found a better way to repair the item that improved its reliability and consequently resulted in the item lasting longer in the field and not being brought back for repair as often. Since the contractor had control over how the repairs were done (typical for a PBL contract), the contractor would not need the customer's permission to implement the improved repair process. However, since the better process resulted in fewer repairs, the threshold for renegotiating the price may be exceeded. Therefore, the number of repairs would be less than forecasted, and the price for the CLIN (which is fixed price based on an assumed quantity) would be adjusted downward. This results in the contractor receiving less revenue for doing a better job. Furthermore, the contractor would have incurred a cost for implementing the improved method. That cost is reimbursable, but it would have to be incorporated into the price renegotiations.

Using VECPs provides an incentive for the contractor to make such a change and avoid the negative consequences. DOD would benefit from the change (since the improved repair method would most likely not be implemented without a VECP). In addition, DOD would receive future contract savings by requiring the contractor to document the "better way to repair" so it can be made available to future follow-on contractors.[21]

There are different VECP settlement options. If the award of a follow-on option is required for the contractor to receive an adequate return on investment, the most common way to share savings is for DOD and the contractor to share savings based on FAR guidelines for three years, after recovering any non-recurring costs. For this example, the contractor and DOD would have to come to agreement on which repairs were affected by the VECP and by how much. Then there would need to be a change in the contract that actually reduces the price to show savings.

If the cost to implement the change is small, the FAR offers the no-cost settlement method, where the contractor retains all of the savings on the existing contract and DOD receives all future savings. In this instance, this would be accomplished by DOD agreeing to not reduce the

[21] Adding a requirement for the contractor to document would also satisfy the requirement that a VECP must have a change in the contract.

price for repairs on the existing contract because there is a decreased quantity of them (of course, DOD would have to be convinced that the decrease in the number of repairs was due mainly to the contractor's better repairing technique).

## B. Using VECPs to Pursue Contractor Goals beyond Shared Savings

The above discussions used a business case based on cost and profit. While increasing profit is very important, other factors also motivate a sustainment contractor. Value engineering can help address most of these factors:

- Capturing follow-on work

  To capture future business, the contractor may withhold some cost reducing ideas if a contract is nearly completed and then use those ideas when bidding on the follow-on contract. This approach would have to be balanced against the good will to be gained by proposing them early. Given DOD's typical delay in processing VE changes, the contractor might achieve both. The contractor could propose the ideas and receive the good will, but DOD delay in approval may result in all other competitors bidding on the old baseline.

- Improving the contractor's reputation

  Proposals to save DOD money should enhance the contractor's reputation as a cost conscious supplier wanting to improve performance and reduce DOD's cost. This would be especially true if the contractor were to use some of the savings to perform additional work for the customer. This provides two benefits for the customer. First, the program office may not otherwise be able to retain the savings if there were contract price reductions. Second, it is often difficult for a program office to obtain resources to fund additional tasks after awarding the prime contract.

- Obtaining a good recommendation regarding performance and customer satisfaction

  Proposing, evaluating, and processing a VECP requires a good deal of positive interaction between the contractor and the program office. This positive interaction, where both parties are exploring ways to reduce cost and improve performance, leads to a positive relationship with the customer and the personal contact involved can lead to the customer providing good references.

  In situations where there are both procurement contracts and sustainment contracts for the same system, performing efforts on a cost reimbursable sustainment contract that DOD may have trouble authorizing on a fixed price contract (e.g., studies, configuration and data management and improvement efforts), may enable the contractor to offer a lower cost on a production contract. Keeping the cost down may also reduce the threat of competition for the sustainment contract. While many of the activities authorized under the sustainment contract would remain sole source to the prime contractor

because of his knowledge as the system design agent, others would not. Logistics management and most repairs could be done by others, including many small businesses. It would not be unusual for DOD to compete these efforts in a separate contract. By keeping the price down and offering VECPs to lower it, the prime could potentially prolong the contract period and perhaps avoid competition.

- Avoiding risk and the potential for losses

  The contractor can use VECPs to propose changes that would reduce risk by challenging requirements and/or investing shared savings in new technology that could reduce risk. The positive relationships derived from processing a VECP could lead to the parties working together to use VE to address risk reduction in the future.

- The opportunity to incorporate new technology to enhance profit or to increase competitiveness

  Incorporating new technology to reduce cost and risk is inherently attractive to both the contractor and DOD, as long as it can be achieved with acceptable risk. The savings generated from VECPs may be used to pay for such technologies, even if it takes longer than the term of the current contract to recoup the investment.

- Reducing “less desirable but necessary” work

  Challenging the requirements and/or the use of new technology can reduce undesirable work. For example, sensors and a TV camera may reduce the need for guards or reduce some of the undesirable work that guards perform in remote locations. Also, new software technology could reduce the time required for data entry. As discussed above, VECPs may provide funds for such new technologies from the shared savings. The ability to challenge requirements is not unique to VECPs. While the contractor could challenge and perhaps eliminate requirements without using VECPs, their use makes such proposals economically viable by allowing the contractor to share in the resulting savings. Otherwise, the contractor would have costs and profits reduced from the change without any corresponding economic benefit.

# 5. Best Practices for Identifying VE Opportunities on Sustainment Contracts

## A. Challenging Requirements as a Basis for VECPs

Value engineering provides an incentive for the contractor to challenge requirements in order to simultaneously reduce DOD cost and increase contractor profit. This is especially true for PBL contracts that are developed using standard templates because some of the standard requirements may cause the contractor to apply resources in areas where DOD does not absolutely need them.

Consider, for the purpose of this discussion, a situation where there is a requirement for an average time to repair of twenty-four hours. The contractor may have to maintain a large staff and a large amount of inventory to ensure that this twenty-four hour repair time can be achieved for everything is sent to be repaired. However, after a study of what is repaired and where it goes when repaired, the contractor may find that a significant percentage of the repairs are sent to an inventory control point where they may sit on the dock for a week or two before being put into inventory. While clearly repairs going to the field might need a twenty-four hour turnaround, those going to a warehouse may not. The contractor's study may show that if the requirement were seventy-two hours repair time for those items going to a warehouse, its repair staff could be reduced by 20 percent, or one person, and its inventory could be cut back by a similar amount.

In this case, the contractor could send a VECP to the customer proposing that the twenty-four hour average time to repair be limited to those items being sent to the field and that other repairs should have a seventy-two hour requirement. The contractor could offer to share in the savings resulting from reductions to personnel and/or inventory and the VECP could be settled in the normal way—a reduction in the price and a sharing of the savings. From a contractor's perspective, revenue is reduced and profit is increased.

A variant on the no-cost settlement approach could apply to this situation. Since it may take time to calculate the savings, DOD could agree to the change and postpone its determination of the savings share until more cost data became available. There may be no change in the contract price, but DOD could receive some additional service it wanted in exchange for agreeing to the change in the requirement. The contractor could be allowed to keep any savings on the repair. This settlement approach would be especially beneficial to DOD and industry if the contractor were not actually able to reduce staff because of a union contract or some other constraint. The contractor would still be using less labor on the repair task due to the relaxed requirement. That labor could be used on some other task DOD wanted. In this case, DOD could pay for part of the cost of the new task and the contractor would do it with the additional labor he gained from the

change. Thus, DOD would be getting a good price on this additional effort. The contractor would benefit by keeping any savings on the repair.

On a cost reimbursable contract, the contractor may be required to maintain a fixed capability regardless of the amount of repair or maintenance work accomplished, e.g., there may be a requirement to maintain personnel for configuration management, obsolescence management, system safety, finance, program and property management, etc. The cost of these efforts may be far greater than the direct labor costs for repair or maintenance itself. A VECP could challenge these requirements.

For example, as part of the configuration management plan, some programs require the contractor to maintain "as built" documentation that contains a record of the origin of each part that goes into the system as it is built and during repair. As part of a repair, the contractor may even be asked to verify the existing as built documentation on the item. The requirement to maintain documentation is important early in a system's life to determine weak points and reliability issues. But after a system has been operating for a long time, there may be enough history that there is no need to maintain such a requirement or at least it is possible to reduce the scope of the requirement to potential problem areas or where something new is added to the configuration. Doing so may reduce the need for one or two people. The contractor could not make such a change without a VECP.

## B. Improving Efficiencies

New technology may be available to reduce some efforts. For example new software programs are available to aid in configuration management and in reducing the workload. However a contractor would not invest in such software because the investment may be treated as an allowable cost (such software programs are usually an overhead expense) and any labor saved would just reduce revenue. With a VECP, the contractor could share in the savings to offset reduced revenue.

Not every program needs to maintain a large, fully functional organization for every discipline that may be involved in a sustainment contract. As a sustainment contract progresses, some *mandatory* VE funding could be used to study the effort under the functions and determine whether there is any saving possible by combining them or at least partially combining them with similar efforts on other programs. For example, obsolescence management efforts on other programs may offer some synergy so it would not be necessary to have two programs concerned with the obsolescence of the same parts. A mandatory VE effort is necessary since a contractor would not want to invest its own resources in studying functions that the customer may not want to eliminate.

## C. Identifying Areas of High Cost Risk

When a contractor begins a sustainment contract (or any other contract for that matter), one of the first and most important tasks is to identify the significant risks and opportunities. The contractor can use VE methodology to identify the significant risks and resulting opportunities for savings and then use VECPs as an important option for managing the risks and capitalizing on the opportunities. Typically, such risks and opportunities are associated with the major cost drivers. If anything changes to affect the assumptions behind the contractor's bid, there may be a potential for loss or for extra profit.

The following bullet points describe activities that can be used to identify risks and opportunities and how VE can be used to mitigate risks and capitalize on opportunities.

- Program Start-Up Reviews

  Many companies conduct internal program start-up reviews. These reviews are held after the contract is awarded and normally follow any mandated customer reviews to take advantage of what may be learned from customer start-up reviews. One of the principal purposes of such reviews is to ensure every contract requirement is identified and the person or organization responsible for satisfying the requirement is assigned. A secondary purpose of these reviews is to compare the price, the contract requirements, and the customer expectations for each element of the statement of work or other deliverable. Any disconnects between the three are identified and someone should be assigned the responsibility to resolve them. The resolution may take many forms including, but not limited to, reallocating program budgets or requesting a contract change. If it is determined that what the customer wants is not actually required by the contract, the idea of a VECP may be explored as a way to change the contract to match the customer expectations. This is particularly true if the customer's expectations exceed the requirements and the resources budgeted to achieve them. The contractor's experience and working relationship with the customer on VECPs in the past can help influence the customer to consider using VECPs as a solution to the mismatch. If there is no past history, it may be necessary to offer a VECP for something the customer really wants first, such as the use of a new technology, before a contractor tries to use it to correct contract disconnects.

- Budget Reviews

  All programs hold budget reviews. If there is an Earned Value Management System (EVMS), these reviews are mandatory to address budget, work, and schedule variations. Regardless, such reviews represent a chance to identify the cost drivers or areas where there could be cost growth. VECPs should be considered as a way to offer new technologies, challenge the requirements, and/or present a better and less costly way of accomplishing the work.

- Risk reviews

  Risks are reviewed by program management at the start of the program and periodically throughout the life of the program. Some larger programs have a dedicated risk manager who tracks risk and ways to manage it. Regardless of whether there is a risk manager, good program management requires risk identification, tracking, and planned mitigation. VECPs can and should be a part of any risk strategy. The opportunities to use new or different technology through shared savings and the ability to use VE to challenge unneeded requirements offer powerful incentives to use VECPs to manage risk. For example, if there was fear of a component becoming obsolete, and/or being unreliable, a VECP could be considered to replace the part and finance doing so by paying for it out of the savings.

- Technology Benchmarking

  Using different technologies can offer the opportunity for significant savings and perhaps better performance and risk reduction. Discovering what is available can be accomplished through benchmarking the tools and methodologies others are using to do similar work. This could be based on what other programs elsewhere in the company are doing, or monitoring what competitors are doing through open source literature or attendance at conferences, symposia, and trade shows. Additionally these sources may reveal better and/or less expensive suppliers for items being purchased. If a contract change or significant testing and qualifications are required to bring in components from these new suppliers, a VECP may be the best way to finance them.

# 6. Conclusions

Although VECPs are not currently being used on service/sustainment contracts (which account for more than half of DOD's contract actions), this document has described why this should change. It has presented plausible business cases, based on actual sustainment contracts, for using VECPs on sustainment contracts as a function of contract characteristics and VECP settlement options; identified other less quantifiable benefits to industry for using them; and documented places in common contractor processes where VECPs should be considered to challenge requirements, reduce risk, and capitalize on opportunities.

DOD leadership has prescribed the use of VE to pursue Better Buying Power 2.0 initiatives that reduce the cost of the products and services DOD acquires. To comply with this direction, actions must be taken to remove the barriers to VECPs:

- A training and awareness campaign should be conducted to initiate a change in the culture of program offices and contracting organizations that inhibit contractors from submitting VECPs.
- The FAR should be modified to include a clause for service contracts and guidance should be developed to (1) identify the mechanisms for sharing savings and calculating savings with increased accuracy and (2) simplify VECP definitization and settlement when there are many contract line items for the same service.
- DOD should add a mandatory VECP clause to direct the contractor to look for cost savings on sustainment contracts that have little incentive for the contractor to improve cost because of the infeasibility of competition (e.g., long term, sole source, fixed price contracts or long term, fixed price contracts with more than several years after a competitive award).

# Appendix A
# Illustrations

# Appendix B
# References


Department of Defense (DOD). "Cost Reimbursement Incentive Contracts." Defense Federal Acquisition Regulation Supplement (DFARS) Subpart 216, Section 216.405. Washington, DC: Department of Defense, September 16, 2011.

———. "DOD Value Engineering (VE) Program." Department of Defense Instruction (DODI) 4245.NN. Pending.

General Services Administration. *Federal Procurement Data System (FPDS) Extract.* Washington, DC: U.S. General Services Administration, January 2012.

———. "Value Engineering." Federal Acquisition Regulation (FAR), Vol. I, Part 48 and Part 52.248-1. Washington, DC: U.S. General Services Administration, March 2005.

Office of Management and Budget. "Value Engineering." OMB Circular No. 131. Washington, DC: Office of Management and Budget, White House, May 21, 1993.

Office of the Undersecretary of Defense for Acquisition, Defense and Logistics. *Department of Defense Contractor's Guide to Value Engineering.* Version 2.4. Washington, DC: Office of the Undersecretary of Defense for Acquisition, Defense and Logistics, August 2011.

Under Secretary of Defense (Acquisition, Technology and Logistics (USD(AT&L)). "Subject: Better Buying Power Guidance for Obtaining Greater Efficiency and Productivity in Defense Spending." Memorandum. Washington, DC: Department of Defense, September 14, 2010.

———. "Subject: Value Engineering (VE) and Obtaining Greater Efficiency and Productivity in Defense Spending." Memorandum. Washington, DC: Department of Defense, December 6, 2011.

U.S. Congress. "Value Engineering." *Title 41, U.S. Code, Section 1711, "Public Contracts*." Washington, DC: U.S. Government Printing Office, January 4, 2011.

# Appendix C
# Abbreviations

| | |
|---|---|
| CDRL | Contract Data Requirements List |
| CLIN | Contract Line Item Number |
| CPAF | Cost Plus Award Fee |
| CPFF | Cost Plus Fixed Fee |
| CPIF | Cost Plus Incentive Fee |
| CRP | Cost Reduction Proposal |
| DFARS | Defense Federal Acquisition Regulation Supplement |
| DOD | U.S. Department of Defense |
| EVMS | Earned Value Management System |
| FAR | Federal Acquisition Regulation |
| FPDS | Federal Procurement Data System |
| FY | Fiscal Year |
| NRE | Non-recurring Engineering |
| OMB | Office of Budget and Management |
| PBL | Performance-based Logistics |
| ROI | Return on Investment |
| T&M | Time and Materials |
| USD (AT&L) | Under Secretary of Defense (Acquisition, Technology, and Logistics) |
| VE | Value Engineering |
| VECP | Value Engineering Change Proposal |
| VEPR | Value Engineering Program Requirement |

| REPORT DOCUMENTATION PAGE | | Form Approved OMB No. 0704-0188 |
|---|---|---|



| 1. REPORT DATE (DD-MM-YY) | 2. REPORT TYPE | 3. DATES COVERED (From – To) |
|---|---|---|
| December 2012 | Final | |

| 4. TITLE AND SUBTITLE | 5a. CONTRACT NO. |
|---|---|
| Value Engineering and Life-Cycle Sustainment | DASW01-04-C-0003 |
| | 5b. GRANT NO. |
| | 5c. PROGRAM ELEMENT NO(S). |

| 6. AUTHOR(S) | 5d. PROJECT NO. |
|---|---|
| Jay Mandelbaum, James R. Vickers, Anthony C. Hermes | |
| | 5e. TASK NO. AU-6-3140 |
| | 5f. WORK UNIT NO. |

| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) | 8. PERFORMING ORGANIZATION REPORT NO. |
|---|---|
| Institute for Defense Analyses<br>4850 Mark Center Drive<br>Alexandria, VA 22311-1882 | IDA Document D-4710 |

| 9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) | 10. SPONSOR'S / MONITOR'S ACRONYM(S) |
|---|---|
| Office of the Assistant Secretary of Defense for Research and Engineering, Systems Engineering, Mission Assurance<br>3040 Defense Pentagon, Room 3C160<br>Washington, DC 30201-3040 | OASD(R&E) |
| | 11. SPONSOR'S / MONITOR'S REPORT NO(S). |

**12. DISTRIBUTION / AVAILABILITY STATEMENT**

Approved for public release; distribution is unlimited.

**13. SUPPLEMENTARY NOTES**

**14. ABSTRACT**

This document (1) describes plausible business case considerations for Department of Defense (DOD) contractors to submit Value Engineering Change Proposals (VECP) based on tradeoffs between revenue and profit and (2) identifies other benefits to the contractor, including capturing follow-on work, improving its reputation, obtaining good recommendations, reducing risk and the potential for losses, incorporating new technology to increase profit or competitiveness, and reducing less desirable work. This document also identifies places in common contractor processes where VECPs should be considered to challenge requirements, reduce risk, and capitalize on opportunities. These processes include program start-up reviews, budget reviews, risk reviews, and technology benchmarking.

**15. SUBJECT TERMS**

value engineering, value engineering change proposal, better buying power, sustainment contracts

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NO. OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
|---|---|---|---|---|---|
| a. REPORT | b. ABSTRACT | c. THIS PAGE | | | 19b. TELEPHONE NUMBER (Include Area Code) |
| U | U | U | UU | 45 | |