

VALUE ENGINEERING AS AN ENABLER TO DEFENSE REFORM

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Kenneth H. Brockel is Chief of the Power Sources Ground Support Division at the Communications Electronics Command(CECOM), Ft Monmouth NJ. Mr. Brockel received his BSEE from the University of Toledo(Ohio) in 1967. He began his career in industry, at Frequency Engineering Laboratories(FEL) in Farmingdale , NJ where he was a microwave development engineer. In government since 1975, he has worked in areas of tactical radio, and communications technology. Since 1983 Mr. Brockel has held key management positions in the research, development, and readiness areas. Mr. Brockel has been a leader in developing the C3 modeling and simulation program for the Army. He has published numerous technical papers on a wide variety of communications technology subjects. Mr Brockel was the architect of the Specs and Standards Acquisition Reform(SSAR) program within Ft. Monmouth's Team C4IEWS community. He also has been a leader in developing the Army's Modernization Through Spares(MTS) Program. Currently Mr. Brockel is responsible for managing the power sources ground support program at CECOM. He remains active in the continued development/improvement of the MTS program for the Army.

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Ms. Latonya Jackson was born in Long Branch, New Jersey, in August of 1971. She began her government service in spring of 1993 at the Communications-Electronics Command (CECOM), Fort Monmouth, New Jersey. Ms. Jackson entered the government as cooperative education student through Monmouth University. Her primary duties included budgetary analysis, inventory control, tracking of funding, milestones and functional requirement in support of development programs and support agreements. Her ambition, motivation and dedication to get the quality product to the war fighter effectively has lead her talents to be easily recognized. Once she received her bachelors in Business Administration, she became the Business Manager for Standardization Program Team / Specifications and Standards Acquisition Reform (SPT/SSAR). Ms. Jackson assists the senior manager responsible for the implementation of the (SPT/SSAR) program at Fort Monmouth, initiates and develops program objectives and program objectives and program plans in support of DoD acquisition reform initiatives. Her ability to stay focus on all objectives is a major asset. To date, she is a Supply Specialist intern. She is represented on the following DoD OIPT working team's to include Office of the Secretary of Defense, Market Research and Communications Requirements and the Department of the Army, Modernization through Spares.

Cynthia Lovekin, U.S. Army Communications Electronics Command Fort Monmouth, New Jersey



Ms. Cynthia Lovekin is a General Supply Specialist Intern, Value Concepts Office (VCO), U.S. Army Communications Electronics command, (CECOM). She has been employed by CECOM for nine years, all of which have been in the VCO. Ms. Lovekin's responsibilities include serving as a VE Workshop coordinator, developing local guidance and policy and developing the yearly Value Engineering Master Plan for CECOM. Since assuming her new Supply internship, Ms. Lovekin has been actively working in the Modernization Through Spares program. Ms. Lovekin has received two AMC Value Engineering Achievement Awards for her contributions in Value Engineering.

Abstract

This paper will focus on the Command, Control, Communications, Computers, Intelligence, Electronic Warfare, Sensors Team (Team C4IEWS), Fort Monmouth, NJ effort to ensure successful implementation of various Department of Defense (DoD) acquisition and logistics reform initiatives. The paper will highlight the new Value Concepts Office (VCO) which encompasses: Modernization Through Spares (MTS), Operation and Support Cost Reduction (OSCR), Technology Insertion (TI), Defense Logistics Agency (DLA) Savings thru Value Enhancements (\$AVE), Value Engineering (VE) and a number of other acquisition, technology, and logistics initiatives. Some specific program examples where the application of VE methodology and incentives can provide major life cycle cost and system performance benefits that assure the highest quality improved products are provided to the warfighter.

Introduction

The mission of the VCO is to "provide a viable management tool to improve quality while controlling or reducing costs across the entire spectrum of Team C4IEWS systems, processes, and organizations through the application of Value Engineering aides in achieving the Department of Defense (DOD) desired objective of acquisition and logistics reform. The VCO encourages and implements reform by mentoring Value Concepts (VC) workshops see Figure 1.

A NEW WAY OF DOING BUSINESS

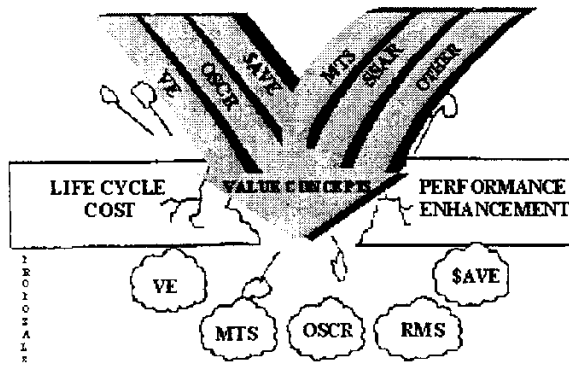


Figure 1

These workshops form multi-function Integrated Product Team (IPTs), working within a performance oriented environment, to develop better products for the war fighter and, at the same time, reduce costs for the Army. These multi-function IPTs which include representatives from the war fighter, civilian, and contractor work force. These workshops employ proven value methodology concepts and techniques, such as the Function Analysis System Technique, within a well structured systems engineering process, to develop "better product" solutions for evaluation and implementation. Implementation can be accomplished through various acquisition reform tools that are managed and guided by the VCO. VCO encompasses the following Army core cost reduction programs:

VE Program: A systematic and creative effort to analyze the function of systems, products, specifications, practices and or processes to ensure that requires

OSCR Program: An investment program in which materiel that is experiencing high operating and support costs is identified, evaluated, and improved. It is different from standard improvement programs, in that reduction of O&S cost, not improvement in performance or readiness, is the goal.

TI: Is an engineering approach used to solve problems associated with production and field support of older systems, whose original design incorporated technologies which are now obsolete and impossible or too costly to procure. TI attempts to re-engineer a system by selectively replacing the original technologies with more version, for the purpose of making that system more producible and supportable.

MTS Program: Is a spares acquisition strategy applied throughout the materiel acquisition life cycle to reduce sustainment costs. It is based on technology insertion and use of commercial products, processes, and practices to extend a system's useful life. (1998 MTS Strategy)

DLA SAVE: The intent of this program is to form partnership with the Services in order to leverage resources and form a network to implement support initiatives. The primary goal is to increase, DLA and DOD saving/cost avoidance while improving combat troop support. To meet this, DLA hopes to use the Services' unique combination of weapon systems expertise and access to technical data to help identify DLA problems items and potential candidates for improvements.

The key to success is to link and apply these initiatives together to execute projects directed towards the end goals of acquisition reform. Also key, is support of these projects through empowerment of the project integrated product team (PIPT). This concept has proven successful in managing Team C4AIEWS major systems and is now proving equally successful for the much smaller world of acquiring spare parts for the army's sustainment base. One major focus of the reform is to get the latest technology to the soldiers expeditiously while also reducing the Department of Defense burden on logistics/sustainment cost.

PERFORMANCE BASED ACQUISITION PROCESSES

Whether we are talking contract statements of work, or actual specifications, the definition of performance based requirements can be simply stated as a compilation of all quantifiable characteristics

that define what the end customer requires to meet his mission need. Performance based requirements state the need in terms of the required results with criteria for verifying compliance, but without stating the methods (manufacturing or materials processes) required to achieve the end result. The methodology passes more of the responsibility for product performance to industry. Government oversight and associated cost is reduced while minimizing total risk to the customer. Contractors in the industrial base benefits from the elimination of cost of sometimes overwhelming government oversight, as well as the capability to innovatively manage their materials and manufacturing processes consistent with their commercial product lines.

C4IEWS Business Environment

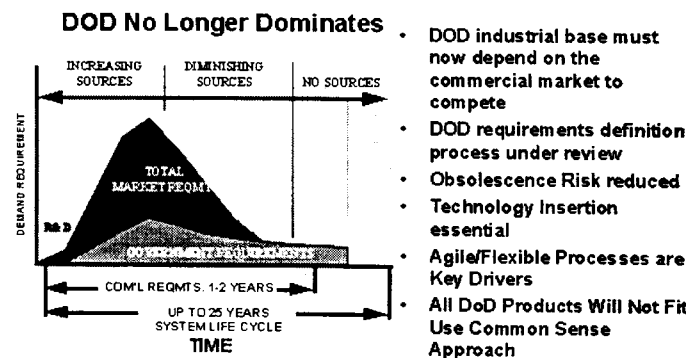


Figure 2

MILITARY VS COMMERCIAL MARKET DRIVERS

To better understand why the Army is extremely interested in exploiting the commercial market place one needs to compare the acquisition/product life cycle for commercial vs. military parts and products they support. Figure 2 describes the comparison for the traditional military vs. commercial electronic product line. The example is just the average. If we look at the extremes in the commercial market place, the computer, computer software, cell phone/pcs product lines have life expectancies measured in months, not years. This market place has been driven by consumer pressure for more of the same. Cost on these products has continually reduced while product functionality has improved by many orders of magnitude in just a few years. The Army has now put a lot of emphasis on integrating these commercially driven technologies into products for the warfighter. One way this is being accomplished is through technology upgrades of systems and their

component parts. To be successful the Army must acquire and logistically support these systems in the same manner as the commercial products are supported. Linkage of core competencies in acquisition, technology, and logistics is essential to the success of the reform program. Figure 3 provides the vision that all these functional experts must work within the PIPT environment. Most importantly, these teams include the DoD as well as industrial based partners. The program examples described in the paper will highlight the savings and other program benefits that are becoming a reality as the acquisition reform program is executed.

projects/products/programs that are considered high cost and contain problematic components. PEOs/PMs are requested to identify major solicitations, programs peculiar specifications and any MIL SPEC slated to be converted to performance spec.

Expected benefits to be achieved through the use of partnering and IPTs include improved efficiency and cost effectiveness, increased scope for modernization, and the continuous improvement of quality products, services/support, and processes.

THE VE PROCESS IS AN ENABLER FOR ACQUISITION REFORM/REVOLUTION IN MILITARY LOGISTICS

Team C4IEWS has taken a pro-active stance in promoting Specs and Standards Acquisition Reform. In Team C4IEWS Value Concept Office, Partnering/Teaming is accomplished via Value Engineering Workshops. The VE Workshop is THE tool with a specific methodology used to analyze and improve weapon systems, programs, and processes.

The workshops are executed in a teaming environment with both Government IPT, industry, and most importantly, the user (warfighter) working together. The workshops employ proven Value Engineering methodology within a well configured engineering process system, to develop performance amplification and cost reduction solutions for evaluation and implementation. They stimulate creative thinking in problem solving, establish true Government and industry partnership, and create mentorship programs. A mentorship develops a project leader, funding source for the Value Engineering proposal and insures the successful implementation of proposals.

The VE workshops are one week long and use the equipment Integrated Product Team (IPT): the contractor who is/will/has worked on that particular piece of equipment and the user of the equipment. The workshops are facilitated by a Certified Value Specialist (CVS). By combining the government, contractors and users, we ensure success by maximizing the team creativity, establishing a "true" partnership between government and contractors. The workshop stimulates "Out of the Box Thinking" and creates IPT mentorships. A mentorship develops a project leader and a funding source for the VE proposal and insures successful implementation of proposals.

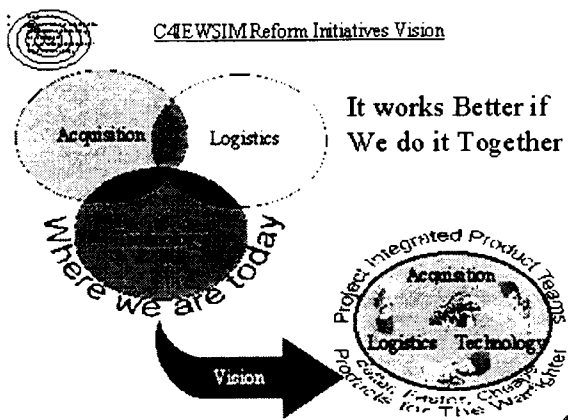


FIGURE 3

INDUSTRIAL PARTNERSHIP KEY TO TEAM C4IEWS SUCCESS

CECOM is committed in establishing Industrial Partnerships, a proven tool/existence, which builds teamwork and commitment between parties (contractor, Government, user/customer) while seeking to improve efficiency in achieving a variety of command goals. Partnering offers cost effective alternatives to miscommunications leading to circumstances requiring litigation. This is based on redirecting possible adversarial intensity into constructive channels.

Internally, C4IEWS employs the partnering philosophy by creating Integrated Product Teams (IPTs). These IPTs work within a performance oriented environment to develop better products for the warfighter and simultaneously reduce costs for the Army. These multi-functional IPTs include representatives from the three C4IEWS communities as well as representatives from the contractor and or contractor community and most importantly, the user (warfighter). The IPTs effectively identify

There are a number of mentorship programs that are focused on this Modernization Through Spares effort. These projects are being executed by PIPTs. The following projects are good examples where the process is working well.

GYROS (DISPLACEMENT AND DIRECTIONAL)

The workshop was intended to address the outdated technology problem of the directional and displacement gyroscopes currently used on board Army rotary wing aircraft, and determine replacement technology that may be available. The workshop created a partnership between Team C4IEWS, PM BLACKHAWK, six gyro manufacturers (Litton, Honeywell, BF Goodrich, Naras Aviation, Flightline, & Allied Signal) and two rotary wing airframe builders (Boeing & Sikorsky) participated.

The workshop members were divided into two teams, one looking at plans for sustainment of the current gyros and the other addressed the future replacement of assets while retaining form, fit and function. For each study, industry representatives provided valuable input/ recommendations. For the current gyro overhaul and repair programs, it was recommended that the MIL SPEC requirements, written in the 1960s, be replaced by existing commercial specifications such as the ones the Federal Aviation Administration uses. A change to commercial specifications will enable these programs to utilize the latest available technologies. These changes will permit greater Mean Time Between Failures (MTBF) on units, and greater accessibility of repair parts for the contractors. Recommendations for future gyro replacements with current technology will focus on the use of commercially available units to replace the 1960s vintage gyros. A total of 16 ideas resulted (14 from team one and two from team two) which could yield significant savings to the government by improving the performance, maintainability, reliability and interchangeability of the gyros.

Team C4IEWS has established a gyro mentorship program and will take initiative to follow up on the recommendations for improvements and implementation to the current repair program. The long term goal, replacing the vintage design with state of the art technology, will be coordinated with the associated aircraft Program Managers.

The results of the workshops is encouraging. The workshops provided synergy for the government, contractor and users to become partners/team members in the mutual development of function oriented performance specs, while enhancing the overall system and reducing production and life cycle costs. This was a WIN- WIN effort for the government and the contractor and will ensure that the VE methodology will be used during the contract definition phase of a program.

AN/PPS-5 MENTORSHIP PROGRAM

The AN/PPS-5 is one of a number of pilot/mentor programs now being funded under the acquisition reform initiatives seed money. The program is focused on exploiting the latest computer and digital signal processing (DSP) communications technology to extend the life of a currently fielded but obsolete product. The cost of this project will be lower than the original cost to develop the base product. More importantly we will be providing the soldier with the latest state of the art digital sensing capability that far surpasses the performance of the currently fielded system. The obsolescence issue will be a problem of the past since replacement parts will be provided through a continuous series of upgrades that will track current technology derived from the commercial market place. The logistics cost is attacked on several fronts. Vision will become a reality on this program.

AN/PPS-5 PROGRAM USES A NUMBER OF INITIATIVES

In addition to the VE program, the PPS-5 utilized the OSCR program to obtain the necessary funds to add to the SSAR redesign effort and development of a prototype. The use of DSP and an aggressive acquisition program provides cost savings for the Army as well as meeting the needs of the soldier today and in the future. The cost savings are best demonstrated by the insertion of new technology which reduced the cost and quantity (from over 150 to 10 or less) of spares. The new technology has simplified the maintenance training and processes allowing for a reduction of the total number of maintainers in the field. IETM's are being developed for both operator's and maintenance which will be installed on the Handheld computer. Tobyhanna Army depot will become the system integrators of the upgrade as well as providing Depot support which reduces infrastructure costs. Intelligent Data is being developed which will become the basis of the Performance Specification. This allows for

competitive bidding for future procurements and enables modeled simulations for future upgrades as well.

The following workshop examples offer ideas to support the incontestable concept and insertion of the new Acquisition Reform initiatives.

Fire finder (TPQ-36(V8) Operation Central Electronics Upgrade

A workshop was held to identify cost reduction/performance improvement ideas. Although the contract was based on performance-based documentation, the Value Engineering workshop proved that improvements can still be made. Three Value Engineering ideas were generated from the workshop and one was submitted and approved as a Value Engineering Change Proposal. The VECP replaces the Mass Storage Expansion Unit with a CD-ROM unit, and results in a unit cost reduction of \$375,000 for the Government over a three-year period. There will be additional operation and support cost savings over the life cycle of the systems to the Government beyond the three-year VECP saving-sharing period.

Software Engineering

The workshop was a continuing attempt in C4IEWS community to apply Value Engineering methodology on software development programs. The workshop goals were to;

1. Define ways to incentivize contractors to migrate to Defense Information Infrastructure Common Operating Environment
2. Define a methodology to incentivize contractors to reduce the level of effort/improve performance/finding better ways to meet requirements
3. Learn Value Engineering methodology
4. Create Function Analysis System Technique models ;of current and alternative software development/procurement practices and identify the differences for further analysis.

A case study for a combat identification and situational awareness system was developed for the workshop. A list of recommended ideas were developed during the workshop, and when applied to the case study, showed that Value Engineering should be used to improve software program, performance, quality, maintainability, supportability, reliability and reduce life cycle costs. An action plan

was developed to begin a pilot project incorporating the workshop recommendations. The workshop not only utilized postmortem analysis techniques to identify the operational (soldier) and technical (engineer) performance requirements with the greatest return on investment, or in this instance, the award fee criteria on fixed budget and schedule. The award fee basis was for improved operational and technical performance, and improved quality of the vendor's process and associated improvement of end product quality from the improved process.

Modernization Through Spares (MTS) Study for Firefinder TPQ-36

An MTS study was initiated by PM Firefinder within C4IEW to study the incorporation of AN/MPQ-64 Sentinel Radar system improvement changes into the existing AN/TPQ-36 production baseline as well as potential field retrofit of AN/TPQ-36s. The AN/MPQ-64 Sentinel Radar was originally developed from the AN/TPQ-36 Firefinder Radar and shares many common components with the AN/TPQ-36. Commonality has been lost over the years, due to improvements made on the AN/MPQ-64. By using the Modernization Through Spares concept, the goal was to:

- Upgrade the AN/TPQ-36 Radar Antenna Group by using AN/MPQ-64 upgrades
- Bring back the commonality to reduce maintenance and logistics support
- Reduce significant acquisition cost, time and effort to bring a replacement system into the field.
- Extend the useful life of the AN/TPQ-36

The workshop goals were to evaluate alternatives in areas requiring non-recurring engineering cost, and develop implementation plan/Engineering Change Proposal for five identified "Drop-in" components. Two proposals with recommendations were generated from the workshop.

Rechargeable Batteries as Alternate Power Source in the Field

The workshop examined the implementation of a rechargeable battery Standard Operating Procedure (SOP) for training and other non "go-to-war" scenarios in order to satisfy a mandate from DA to reduce battery related operating and support (O&S) costs by 50% in five years. Four areas deemed essential to successfully implementing a rechargeable batteries policy were addressed in the workshop:

