

Cost As An Independent Variable (CAIV)

Introduction

Cost as an Independent Variable, or CAIV, is defined in Section 3.3.4 of DoD 5000.2-R, as:

“. . . a process that helps arrive at cost objectives (including life-cycle costs) and helps the requirements community set performance objectives. The CAIV process shall be used to develop an acquisition strategy for acquiring and operating affordable DoD systems by setting aggressive, achievable cost objectives and managing achievement of these objectives. Cost objectives shall also be set to balance mission needs with projected out-year resources, taking into account anticipated process improvements in both DoD and defense industries.”

CAIV in the Department of Defense is the equivalent of best commercial business practices in the private sector. In that sector, companies continuously work to reduce acquisition and life-cycle costs in response to competitive pressures for quality products, budget-constrained customers, and the market need to develop long term, stable client/customer relationships.

Background and Concept

As defense budgets have shrunk, DoD and service leaders have doubled their efforts to find more effective means of acquiring modern weapons at an affordable cost and in less time. Under Acquisition Reform, their efforts have resulted in standardization reform, use of commercial off-the-shelf (COTS) equipment, and the Single Process Initiative, to name a few. Making cost a truly independent variable in the acquisition process is another important part of their efforts. An essential part of the CAIV concept is a strong user role in setting and adjusting program goals throughout the acquisition process. This user role is especially important in making trades between cost and performance. Such trades are not new. What is new is the impetus behind them. In the past, they were primarily driven by a single, well-defined and dangerous threat and the technologies available to meet the threat. With the demise of the Soviet Union, the United States faces increasingly asymmetrical threats involving terrorism, rogue nations, and weapons of mass destruction in the hands of third-world countries. Coalition warfare has become a more frequent and probable mode of operation. And we must still be able to unilaterally fight

conventional enemies with conventional weapons while maintaining a still-sizable nuclear deterrent.

At the same time that the threat has changed, funding for defense has dropped markedly. CAIV is just a part of the overall strategy for acquiring affordable systems needed to counter the new threats. Achieving the goal of making cost an independent variable in acquisition requires the DoD and military services to take the following actions:

- Set realistic but aggressive cost objectives early in each acquisition program
- Manage risks to achieve cost, schedule, and performance objectives
- Devise appropriate metrics for tracking progress in setting and achieving cost objectives
- Motivate government and industry managers to achieve program objectives
- Develop incentives for reducing the operating and support costs for fielded systems

CAIV versus Design to Cost

At first glance, CAIV may appear to be equivalent to another concept, Design to Cost (DTC). Certainly, similarities exist. Both are intended to control costs. Both require trade-offs. Both are implemented during the acquisition of a system. There, the similarities end. The primary focus of the DTC program is on the projected average unit procurement costs. Projected operations and support (O&S) cost objectives receive only secondary attention. Officially, DTC was supposed to identify drivers of downstream costs for specific weapons systems, to do so early in the life of that acquisition program, and to consider ways to keep those costs under control. In practice, DTC focuses on controlling near-term costs. Few incentives are given to spend development funds to reduce production and O&S costs. Trades are usually a case of reducing requirements to stay within a unit production cost target.

CAIV, on the other hand, is clearly aimed at managing to a life cycle cost objective. Furthermore, under CAIV the objectives of trade-offs are more ambitious and sophisticated. As articulated by Dr. Jacques Gansler, Under Secretary of Defense for Acquisition and Technology, at a

1998 conference¹, “CAIV is not intended to force 80% solutions in order to stay within a cost ceiling; it is intended to force better ways to get a 100% solution within the cost ceiling.” At times, relaxing one or more requirements may be the only way to stay within the cost. Nevertheless, working with the contractor to find innovative ways to achieve the required performance within the cost ceiling is clearly the first priority. Other Acquisition Reform initiatives are intended to provide contractors with the flexibility and motivation to innovate. Clearly, the various initiatives, including CAIV, support each other, and all are needed to achieve the goal of affordable, superior systems.

Under CAIV, it is important to include the user, support, and acquisition communities on the acquisition team. A principal goal of the team should be to avoid investments that yield a poor return. An example of such an investment might be striving to achieve a performance goal, the final five percent of which drives fifty percent of the cost. Dr. Gansler’s predecessor, Dr. Paul Kaminski, noted that setting the cost is more involved than simply determining the price the market will bear and subtracting the profit margin. He described the past concern with cost as one of looking at cost after 80% of it had already been determined (see Figure 1). He proposed that representatives of the financial community be involved early, and that cost, performance, design, and schedule be evaluated together throughout the acquisition process. Cost, schedule, and performance need to be “owned” by the entire acquisition team.

To maximize the benefits of CAIV, some proponents recommend defining system performance parameters in terms of thresholds and objectives, thereby establishing a trade space (Figure 2). Thresholds are the minimum acceptable system characteristics/capabilities or Key Performance Parameters (KPP) or Critical Performance Criteria. Objectives include desired characteristics

and capabilities above the thresholds. Trade space allows offerors, in response to a Request for Proposal, the flexibility to propose the maximum number of objectives over the KPPs but still within the CAIV cost objective.

Implementing CAIV

Implementing the five actions described earlier (set realistic but aggressive cost objectives early in each acquisition program; manage risks to achieve cost, schedule, and performance objectives; devise appropriate metrics for tracking progress in setting and achieving cost objectives; motivate government and industry managers to achieve program objectives; and develop incentives for reducing the operating and support costs for fielded systems) is neither simple nor easy.

Perhaps the most challenging of these actions is motivating managers to achieve life cycle cost goals when doing so requires up-front investments to minimize production and O&S costs. Program managers must have the proper incentives to take the inevitable risks associated with the innovation necessary to meet performance requirements within aggressive cost objectives. In this regard, promotion policies, awards, and other forms of recognition, as well as effective training and guidance, are important. Most important is an environment characterized by goal setting, teamwork, and continual recognition of achievement by management leaders.

For Further Study:

1. Web Sites: Additional information on CAIV can be obtained from the following websites. In addition, many of the publications in the list that follows can be downloaded from these sites:

- a. <http://av.yahoo.com/bin/query?p=caiv&z=2&hc=0&hc=0> (“Yahoo” query on CAIV)

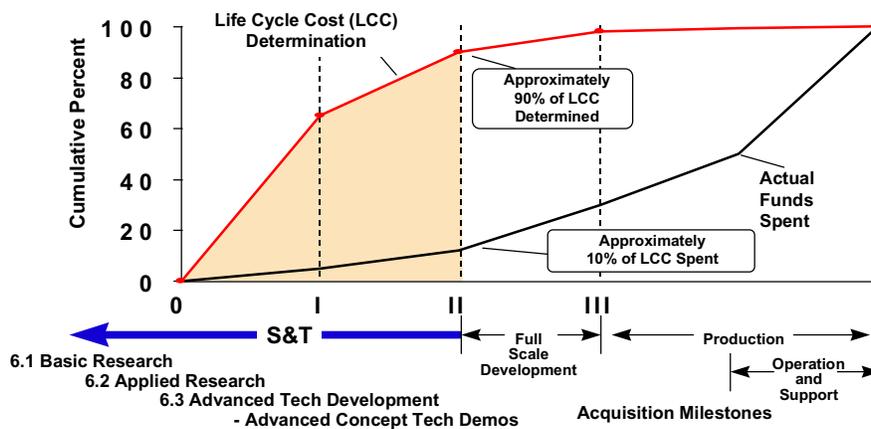


Figure 1. Life cycle costs are determined early in a product’s development

¹“Acquisition Reform for the Long Haul,” Hyatt Hotel, Crystal City, VA, 2-3 February 1998.

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Other START Sheets Available

Many Selected Topics in Assurance Related Technologies (START) sheets have been published on subjects of interest in reliability, maintainability, quality, and supportability. START sheets are available on-line in their entirety at <<http://rac.alionscience.com/rac/jsp/start/startsheet.jsp>>.

For further information on RAC START Sheets contact the:

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