Differences in Philosophy—Design to Cost vs. Cost As an Independent Variable

New Focus on Total Program Costs Doesn't Mean Scrap All Previous Methods to Lower Production Costs

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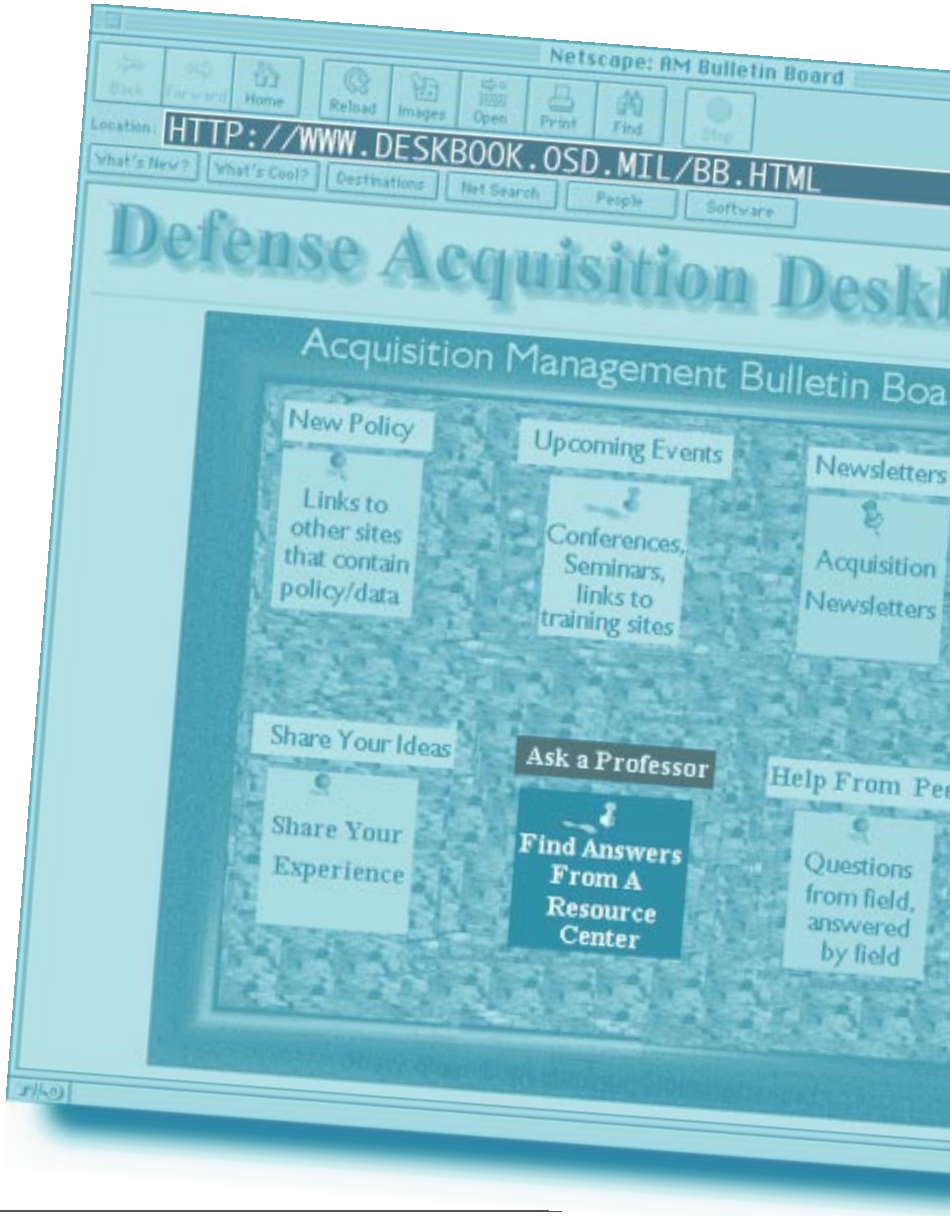
An early question submitted to the "Ask a Professor" program concerned a relatively new philosophy with potential far-reaching implications for the Defense Acquisition community. The question pertained to the Cost As an Independent Variable (CAIV) philosophy and, specifically, differences between the Design to Cost (DTC) program and the CAIV philosophy.[1] This article is based on the response to that question.



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Cost As an Independent Variable (CAIV) has many of the same tenets as the former Design to Cost (DTC) program. What differences exist between the programs? How will CAIV strengthen DTC shortcomings? One problem experienced with the DTC program was failure to adequately incentivize development program managers (both government and contractor) to "trade off" performance and schedule for downstream production and support cost considerations. Seldom do development managers remain on board after production has begun. Consequently, there is a tendency to defer the hard decisions.

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These comments/questions are not uncommon among individuals involved in acquisition for a lengthy period of time; others have noted the

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initial similarities of the two management techniques. The DTC Program goes back at least to the mid-1970s and, although it fell into disuse in the 1980s when program managers placed greater emphasis on using fixed price contracts for production contracts, DTC provisions and requirements remained in acquisition policy documents. In the late 1994, early 1995 time frame, the Deputy Secretary of Defense directed the Under Secretary of Defense for Acquisition and Technology (USD[A&T]) to, "...put in place a process for cost performance trades that permits day-to-day interaction between the Requirements and Acquisition communities by adopting an Integrated Product and Process Development Team approach within DoD." Following work by an Office of the Secretary of Defense (OSD)-level steering group and working group, by memorandum, subject: "Policy on Cost-Performance Trade-offs," dated July 19, 1995, the USD(A&T) set forth the basic philosophy and policy that the cost of an acquisition program (as compared to performance parameters of the program) should be considered as an independent variable. Previously, program managers considered cost as the dependent variable (i.e., the one more likely to change in order for other variables to remain more constant). This memorandum formed the basis for the policy stated in the March 1996 DoD Regulation 5000.2-R relative to Cost As an Independent Variable (CAIV).

The OSD has not yet written all policy statements and detailed implementing instructions on the CAIV concept that will ultimately be published on this subject. As a result, this article is based on various published reports and discussions on the subject. The remainder of the article should not be considered the "final official DoD position" on the subject, but rather a discussion in the spirit of academic discourse on a current but evolving policy.

While the CAIV philosophy has the same ultimate goal as did the DTC Program,[2] the manner by which that goal will be achieved differs between the two concepts.

DTC—Primary Focus and Program Policy

The DTC Program's primary focus centered on the projected average unit procurement costs (with secondary interest on projected operations and support [O&S] cost objectives). Although the idea was to identify cost drivers of the specific weapons system early in the life of that acquisition program and to consider ways to keep those costs under control, program managers (PM) were to give the greatest emphasis to production and O&S costs rather than the total life cycle cost of the program. Because PMs tended toward a greater interest in near-term problems, incentives for spending development funds to reduce production and O&S costs were often not as strong as some competing, near-term requirements.

Specifically, the DTC Program policy included statements such as the following:

> *"...cost will be established as a design constraint early in the acquisition life cycle..."*

> *"A design to average unit procurement cost objects shall be established for ACAT I programs beginning at Milestone I..."*

> *"Initial design to cost activity shall focus on identifying cost drivers, potential risk areas..., and cost-schedule-performance trade-offs early in the development process."*

This newly created program, known as the "Ask A Professor" program, operates in the following manner. An individual in the acquisition workforce can "post" a question pertaining to defense acquisition on the Defense Acquisition Deskbook Web site via a screen that identifies the inquirer, organization, location, phone number, and E-mail address.

"Ask a Professor" Program

DAU Creates Web Site for Acquisition Dialogue

During the May-June 1996 time frame, in a series of meetings sponsored by the Office of the Deputy Under Secretary of Defense for Acquisition Reform (DUSD[AR]) pertaining to the handling of questions received through the Defense Acquisition Deskbook Web site bulletin board, the DUSD(AR), in cooperation with representatives from the Defense Acquisition University (DAU) consortium schools, made the decision to create a new process by which those questions would be answered. In essence, they divided the broad field of defense acquisition into 12 functional areas of expertise and, for most of those functional areas, also designated a Defense academic institution as the Center of Excellence (COE) for each area of expertise. While most of the COEs are consortium schools of the DAU, the representatives also identified and designated several non-DAU schools as COE for the functional areas closely associated with their individual training and education missions.

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If a COE determines a question is better answered by another COE and should be redirected, it sends the question back to the JPO with an appropriate explanation. The responding COE may also recommend that the question and answer (Q&A) be incorporated into the Deskbook Information Structure. Thereafter, the Q&A remains posted on the Web site for a minimum of 90 days and is then either incorporated into the Information Structure, posted for an additional 90-day period, or archived into the Q&A database.

During these meetings, DUSD(AR) and the consortium school representatives also made the decision that answers provided through this program would not necessarily reflect official policy. Obviously, if a COE cites written official policy, the answer is simply re-stating that policy. Because Defense academic institutions do not normally have the authority to set official policy in their own right,* the participants recognized that COEs should not set official policy through answers given to acquisition-related questions. In that regard, answers could be considered an extension of the academic environment in which there is a continuous flow of questions, responses, ideas, and concepts between faculty members and students. Such an environment is considered healthy for our academic institutions.

Editor's Note: You may access the "Ask a Professor" program at the following Web site:
http://www.deskbook.osd.mil/bb.html

* An institution might be asked to either help develop policy or to recommend policy changes, but will not normally publish policy directives impacting activities outside its immediate command structure.

> *"As development continues, efforts shall focus on identifying areas requiring corrective action because of excessive costs. Cost reduction techniques shall be applied to such areas to keep costs within acceptable tolerances."*

Primary policy emphasis was to "...identify cost [to include cost drivers] early in the life cycle; keep costs within acceptable tolerances; and, especially, to design to *average unit procurement costs*." In its implementation, the focus was to "agree on average unit procurement costs"; "design the program to stay within that cost figure"; and then "update/approve updated average unit procurement costs as the program transitioned from one phase to the next phase." Note the reference to "cost-schedule-performance," although there was not an established, practical process to actually achieve trade-offs among those program criteria.

While the primary focus of the DTC Program was for the PM to establish an objective for projected *average unit procurement cost* and then to stay within that cost objective, under the CAIV philosophy, the PM's focus becomes that of establishing aggressive, achievable objectives for the *total life cycle cost* of the program and then making management decisions to achieve those objectives. In addition to there being a different cost objective focus (i.e., average unit procurement versus total life cycle), there are other differences.

CAIV-Primary Focus and Program Policy

Basically, CAIV is an acquisition philosophy intended to integrate proven successful, business-related practices with promising new DoD initiatives to obtain superior, yet reasonably priced, warfighting capabilities. Specifically, CAIV philosophy means that cost should be treated as an independent variable among the three variables traditionally associated with a defense acquisition program: cost, schedule, and performance. Simply put, an

independent variable is one that is "fixed," and other variables react to (or are dependent upon) the stability imposed by that independent (fixed) variable.

Previously, in practice, performance tended to remain relatively stable (i.e., it was treated as the independent variable), while cost increased (i.e., it became the dependent variable). While the total life cycle cost of a given acquisition program will not necessarily be absolutely fixed and never changed during the life of the program, under the CAIV philosophy, much stronger consideration must be given to stabilizing the costs of acquisition programs.

Probably the most significant difference between DTC and CAIV is that the latter's philosophy calls for establishment of a process wherein the PM gives a continuous and honest consideration to trading off performance requirements to stay within previously established total program fiscal constraints (i.e., complete life cycle costs, including development, production, O&S, and disposal costs). The PM gives this "continuous and honest consideration" at each milestone decision point, addressing specific ongoing actions to actively manage (e.g., by implementing cost reduction or cost containment actions) the total life cycle costs of the program. The PM sets aggressive cost objectives and then at each milestone, reports on the progress made toward achieving the objectives.

Under CAIV, there is specific recognition that the best time to reduce life-cycle costs is early in the acquisition process (e.g., it makes sense for the PM to spend development funds in order to save a greater amount of production costs and/or O&S costs when the program transitions to later phases). This recognition was not necessarily present in the DTC Program because of the focus on procurement (and, to a lesser extent, O&S) costs. Actions taken to contain or reduce projected future life-cycle costs are considered as important as actions taken to meet the schedule and performance thresholds.

With regard to the concept that cost containment is as important as performance and schedule under the CAIV philosophy, there is the recognition (along with authority) that it may be necessary to trade off some elements of performance parameters in order to stay within the previously established cost objectives. Trading off performance parameters does not mean that the weapons system being acquired will fail to satisfy the user community's stated military operational requirement; rather, it means that a specific way of achieving that requirement may not be possible.

In order to do this (i.e., trading off performance in order to stay within cost objectives), the operational requirement must be stated in terms of overall system performance capability rather than in a detailed set of performance parameters. The key should be (and must be) that the required military performance capability be established and the acquisition community (both government and commercial) be allowed certain flexibility to achieve that capability (versus having the requirements document state that the requirement must be satisfied by the system having specific performance parameters).

Advantages of the CPIPT

Another difference with the CAIV philosophy is that the PM is not alone in making decisions relative to implementing this philosophy. Early in the life of the program, the PM is to establish a Cost/Performance Integrated Process Team (CPIPT), which has representatives from the three primary communities involved in the business (i.e., the user, industry, and acquisition). The CPIPT is involved in recommending cost objectives for each of the acquisition phases, in the evaluation of the progress being made toward achieving those cost objectives and, when appropriate, in developing recommendations for the trade-offs between performance parameters and costs in order to stay within the cost objectives.

As a primary CPIPT member, the user community is intimately involved in the various stages of this process, including developing recommendations for trade-offs. Basically, the PM has authority to make CPIPT recommended performance, engineering, and design changes that would not adversely impact the program's ability to satisfy the threshold performance capability set forth in the Operational Requirements Document/Acquisition Program Baseline (ORD/APB). If a CPIPT recommendation would result in the program failing to satisfy the ORD/APB threshold performance capability, the PM should pass the recommended changes to appropriate ORD/APB approval authorities for decision.

Other Initiatives

The PM also has available several acquisition reform initiatives that may assist in efforts to lower program costs. Although some of these initiative tools may require a waiver from current statute(s), the PM should seek such waivers in order to meet established cost objectives. Such initiatives include using commercial standards and processes, commercial components, commercial best practices, performance capability specifications (as previously described), and contracting strategy techniques that will allow sharing of cost savings with contractors who bring in the program at or below previously established aggressive cost objectives.

One example of such a contracting strategy would be to include a Request for Proposal requirement for contractors to address how they will achieve cost objectives associated with CAIV philosophy, and then include specific incentives for the winning contractors to achieve those objectives (with appropriate "extra" fees given the contractors when they actually meet or exceed objectives stated in the contract).

Another example of a contracting strategy recently approved to reduce costs associated with acquisition programs is the Single Process Initiative, a coordinated action that allows contractors to use a single process within their own facilities to manage and report on all defense contracts (rather than having multiple different processes and reports called for in each separate contract). While this was not directed at "bringing in programs at established cost objectives," it is an example of smart contract strategy.[3]

Also available to help PMs in their efforts to stay within established fiscal constraints are other proven techniques such as value engineering and DTC; both of these have potential to control procurement costs through design considerations. Just because there is a new focus on total program costs does not mean that all previous methods to examine and lower production costs must be scrapped.

Creating a Climate of Risk Tolerance

Under DTC, there were no specific incentives. By contrast, under the CAIV philosophy, incentives are key. A higher headquarters should be willing to accept risktaking when the potential for future payoff is high. Program managers need the encouragement of users, Component Acquisition Executives, and the Defense Acquisition Executive to accept risk associated with setting aggressive cost targets. Also, promotion policies must recognize and reward not only the major "success story," but also "best efforts" on the part of government acquisition managers (even though every best effort attempted will not necessarily result in a major success story); managers who take the risk and work hard in that risky environment must be recognized for both their successes and their attempts at successes.

Contractor Incentives

Motivating and incentivizing industry must center on ensuring competition through the use of multiple sources, component breakout, leader/follower, dual source, etc. In sole-source environments, cost savings may be realized through the use of value engineering, multiyear procurements, and, as mentioned earlier, aggressive sharing of cost savings between government and the contractor. Some future incentives may include various combinations of previous approaches as well as permitting the PM to retain internally generated savings within the program (for use on program enhancements or to improve operations of the program office). For government personnel (both civilian and military), there should be provisions for awards to individuals and groups within the organizations.

Government PMs of programs in the development phase will find it to their advantage to trade off detailed performance parameters of their system (if parameters exist rather than the preferred overall system performance capability) because of limited alternatives available to the MDA:

- Provide more funding to pay for desired performance parameters (difficult in today's environment of reduced funding for modernization efforts).
- Cancel the program (undesirable assuming the military requirement remains valid).
- Restructure the program through the trade-off process (most likely option).

Contractors of programs in the development phase will also be impacted by these same limited alternatives as well as the continued profit motivation. As stated previously, one potential initiative would be for the government to use a contracting strategy that would allow the sharing of cost savings with contractors who bring in the program at the set cost goals.

Development Manager Tenure

With regard to the comment in the question that development managers seldom remain on board with the program after production begins and, therefore, there is a tendency to defer the hard decisions (to spend development funding to save procurement and O&S costs), the totality of this comment is expected to be inaccurate under the CAIV philosophy. While the CAIV philosophy will not necessarily have an impact on the tenure and assignment actions of PMs, some other actions (such as tenure requirements in the Defense Acquisition Workforce Improvement Act statute) and assignment of civilian PMs to some programs may have such an impact. The "tendency to defer the hard decisions..." will hopefully become a moot point with the requirement (stated in ¶3.3.3.1 of DoD Regulation 5000.1-R) that, "...by program initiation, each ACAT I and ACAT IA PM shall have established life-cycle cost objectives...and at each subsequent milestone review, cost objectives, and progress toward achieving them shall be reassessed."

Again, this was not intended to be a "final official DoD position" on the details of the topic, but rather a discussion in the spirit of academic discourse on a current but evolving policy. The subject continues to be discussed within OSD, and an "official DoD position" describing specific techniques to ensure effective implementation of the CAIV philosophy will probably be published by OSD.

Endnotes

1. The Defense Systems Management College is the COE for the "Business, Cost Estimating, and Financial Management" area of expertise.
2. The goal of the DTC Program is a proper balance among development, production, and operations and support (O&S) costs while providing the customer (user community) with superior warfighting capabilities that satisfy operational requirements according to an established schedule and within an overall affordable cost.
3. Our understanding is that a catalog of contract incentive techniques is being developed and will be made available online in the Acquisition Deskbook.