



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON D.C. 20548

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MAY 15, 1981

The Honorable Caspar W. Weinberger  
The Secretary of Defense



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Attention: Assistant for Audit Reports

Dear Mr. Secretary:

Subject: [Improving the Weapon Systems Acquisition Process]  
(MASAD-81-29)

We are pleased to note the initiatives you and Deputy Secretary Frank Carlucci have taken in your efforts to improve the weapon systems acquisition process.

In his March 2, 1981, memorandum to the military secretaries and others, Mr. Carlucci included a list of concerns that the Steering Group he appointed was to address. We believe it may be helpful to you to have our views on some of these concerns to consider along with the suggestions you received from the Steering Group and others you have solicited. In general, these represent opinions which are based on the many reviews we have made of acquisition programs over the past several years. We recognize that these are not necessarily the only approaches that might be taken to improve the acquisition process.

LOWERING WEAPON SYSTEM COSTS

The Deputy Secretary's memorandum expresses concern that evolutionary product improvement of existing hardware is not receiving its due in the Department of Defense's consideration of how to develop greater capability to meet new needs.

From what we have seen, there have been occasional instances of the military improving its weapon systems for extended periods through modification programs. Examples are the F-4, the B-52, and the HAWK missile. If the services are to be faulted, it is because, in establishing the needs for a new system, they frequently set their performance requirements higher than necessary, in effect, guaranteeing that existing systems, even with improvements, cannot compete with new concepts. These requirements are often driven by a desire to take full advantage of advances in technology more than by actual need. More critical analysis of proposed requirements before they are approved may help keep performance at an affordable and achievable range and also, give existing systems a better chance to compete.

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It has been suggested that a preplanned product improvement program could help lower weapon system costs because contractors would be asked to design their systems with more growth potential than previously. Preparing for evolutionary improvements would help curb quantum jumps in designing new systems. We believe this proposal has merit. Although it has been argued that sophisticated weaponry is being designed for easier operational use and maintainability, there is little evidence to demonstrate that the advanced performance characteristics designed into many systems will accomplish this result. In fact, not only do investment costs tend to increase substantially in real dollar terms because of the high technology being used, it is quite likely that the associated operating and support costs will also grow at high rates as the new systems are fielded. High value spare parts inventories and higher skill levels to maintain the equipment are involved. It is frequently pointed out that an enormous price is paid for that last margin of capability sought. These factors can lead to a considerable demand for defense spending in the out-years, assuming a reasonable state of force readiness is maintained.

However, we see the preplanned product improvement effort as possibly conflicting with the design-to-cost concept. We think contractors would have difficulty designing systems to take maximum advantage of growth potential while being constrained by a design-to-cost goal. If the preplanned product improvement program shows some early tangible results in reducing weapon system costs, there may no longer be a need to retain design to cost.

We also believe that stretchouts, and the resulting higher program and unit costs, can be avoided, or at least minimized, but it would require the services to "bite the bullet" and reconcile themselves to losing some low priority programs so that money can be made available to purchase higher priority weapon systems in economical quantities consistent with needs. We have made this kind of recommendation in connection with the Multiple Launch Rocket System and the AH-64 helicopter, and have testified on reductions from the planned production rates of the F-15, F-16, F/A-18, and A-10.

As to gold plating, we believe that this problem can be reduced by vigorous attention to it at all management levels. A greater cost consciousness has to be developed in the acquisition community by highlighting design economy in your office and in service directives.

MAKING THE DEFENSE SYSTEMS ACQUISITION  
REVIEW COUNCIL MORE EFFICIENT

We believe the Defense Systems Acquisition Review Council (DSARC) should continue in its role of evaluating weapon system acquisitions at major decision points and passing on the merit of permitting systems to proceed into the next acquisition phase.

If DSARC recommendations have sometimes led to the acquisition of systems that proved unaffordable, as the memorandum implies, it may be due to the council not having been provided with as complete or balanced a presentation as was needed for the decision. Although the dates of scheduled DSARC meetings are usually known well in advance, some events that should bear on the decision, such as testing, are frequently far from complete when the decision is due. DSARC then has only partial results or a tentative evaluation report to consider. The Pershing II production decision, for example, is scheduled after only 2 of 28 missile test firings, planned during engineering development. Scheduling DSARC meetings can be improved by having them coincide with the time periods in which better test results and other data are to become available.

We also think the services should be instructed to prepare their cost estimates conservatively. We think you will agree that too much optimism has crept into past estimates. This holds true for operating and support costs, as well as investment costs. Not having a good life-cycle cost estimate further complicates DSARC's task. The recent sudden sharp rise in the cost estimates of several acquisition programs shows that sufficient realism was lacking in developing these estimates. In addition, operating and support cost estimates tend to be soft since they are first made before the system's reliability and maintainability has been tested and established. A more critical review of the cost estimates prepared for presentation to DSARC should be made. In view of the element of uncertainty attached to major weapon system cost estimates, giving DSARC the expected cost ranges would probably be a better indicator than a single estimate. At the earliest milestone, the ranges should be broad, but as the system proceeds through development and is better defined, they should be narrowed.

We believe that, in addition to evaluating the technical merit associated with each system, DSARC reviews should include the system's relationship to or dependence on supporting systems and equipment essential to fully carrying out the assigned mission. By this we mean evaluating the technical and operational compatibility of the interacting weapon systems and the commitment to ensure the availability of other needed assets when the major system is ready for deployment. Recent examples of incongruities within programs include the Army's lack of testing its Tactical Fire Direction Center and Battery Computer System with the Multiple Launch Rocket System, questionable availability of delivery vehicles for the Navy's Captor mine, questionable availability or suitability of standoff weapons for the Air Force's Precision Location Strike System, and timely availability of the Tactical Towed Array Sonar (AN/SQR-19) for the Navy's LAMPS MK-III helicopter.

Greater emphasis is needed in the early stages of the requirements process on logistical support and human factors related to the weapon systems proposed. Many systems cannot be adequately operated, maintained, or supported today because of insufficient attention to these areas during their development. The overall supportability of a system should be demonstrated by the services at each milestone. DSARC should consider this factor to be equally important with cost, schedule, and performance goals. We are encouraged by the new emphasis the Defense Directive 5000.1 gives this important matter.

Finally, we believe that, in line with accepted standards of accountability, DSARC should prepare minutes of its meetings, or some other form of documentation, explaining the rationale for its actions. These should be on the record and available for scrutiny, as appropriate.

#### IMPROVING THE REQUIREMENTS PROCESS

We believe several steps can be taken to improve the requirements process.

- Clearly define and settle on a common set of defense mission areas that are directed at achieving national military objectives.
- Identify the most essential defense mission areas to ensure that sufficient management attention and resources are devoted to them.
- Conduct systematic mission area analyses to identify deficiencies and capabilities needed to make up the deficiencies.
- Place priorities on requirements within each mission area at a sufficiently high level in Defense to ensure that the most needed are satisfied and fully funded ahead of the others.

The objective of such a structured approach would be to minimize overlap, duplication, and system proliferation, and to enhance the prospects of the most needed systems receiving adequate funding. This problem becomes particularly acute where more than one service participates in similar missions, as in counterair and air defense, where both the Air Force and the Army have simultaneous roles.

System alternatives proposed to satisfy a mission deficiency should include both like and unlike systems to broaden the alternatives considered. For example, an antiarmor deficiency could possibly be corrected by an assortment of ordnance and platforms, including munitions, missiles, and mines delivered

from the ground or air. A strategic offensive deficiency could be sufficiently corrected using penetrating or standoff air platforms or ground or sea launched systems.

The requirements should be more carefully reviewed for its operational usefulness. We have seen several cases where system performance will be limited or very difficult in an operational environment. Numerous systems using laser technology like Hellfire, Copperhead, and Maverick, for example, cannot achieve their desired capability without certain environmental and field conditions being present.

More emphasis should be given to risk assessment because technical risk has historically caused severe problems in the development of weapon systems. The purpose would be to disclose opportunities for various tradeoffs to improve chances of meeting operational requirements and minimizing schedule slippages and cost growth. Where risks are high, allowances should be made for incorporating lower risk technology, even if it means accepting a somewhat reduced capability. Corresponding with the degree of technical risk, the Office of the Secretary of Defense and the services should ensure that sufficient research and development funds are allocated to satisfactorily reduce that risk, and the likelihood of problems in later years, through more and better testing. We think a policy of heavier investment in the front end of a system's acquisition will save money in the long run.

INTEGRATING THE DSARC AND PLANNING,  
PROGRAMING, AND BUDGETING SYSTEMS

It appears, regarding better integration of the DSARC process with planning, programing, and budgeting systems (PPBS), that in recent years affordability has become a dominating defense issue as costs have risen along with the demand for numerous new weapon systems. There is obviously a need for coordinating both processes because systems still get approved to enter the next acquisition phase without DSARC members being sure of how much funding resources will be made available. The result has been that key systems are sometimes underfunded.

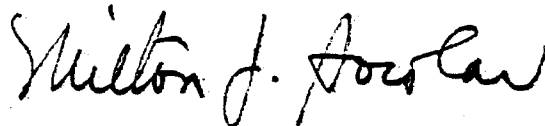
We do not believe that integrating the two systems (DSARC and PPBS) beyond what already exists in the form of common membership on both the DSARC and Defense Resources Board is necessary. In fact, it may be preferable to have DSARC recommendations made on the basis of a system's merit without regard to funding availability to avoid influencing the decision. Although this may present some shortcomings, these can be offset to an extent by taking some steps discussed above, such as establishing priorities for mission areas and for needs within each mission, improving risk assessments, and providing DSARC

with more realistic cost estimates. This would improve DSARC's function and provide better indications for the Defense Resources Board in its management of the PPBS process, particularly with respect to determining which systems merit priority funding.

Since these represent only opinions, and since we are generally familiar with your department's position on these issues, we have not requested comments on the contents of this report. We are prepared to discuss these matters with you or your staff if necessary.

We are sending copies of this report to the House and Senate Committees on Armed Services and Appropriations.

Sincerely yours,

A handwritten signature in cursive script that reads "Milton J. Eisenhower".

Acting Comptroller General  
of the United States