REPORT TO THE CONGRESS

Application Of Design-To-Cost Concept To Major Weapon System Acquisitions

Department of Defense

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

JUNE 23, 1975

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

B-163058

To the President of the Senate and the
Speaker of the House of Representatives

This report describes the application of the design-to-cost concept to major weapon system acquisitions in the Department of Defense.

We made our review pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of Defense; and the Secretaries of the Army, Navy, and Air Force.

Comptroller General
of the United States

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ABBREVIATIONS

GAO	General Accounting Office
DOD	Department of Defense
DSARC	Defense System Acquisition Review Council

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

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Department of Defense

D I G E S T

GAO found that:

--The Department of Defense is applying its 4-year-old plan of designing weapon systems to a cost it can afford to virtually all major systems now in development.

--As a result, the incidence of costly but marginally useful performance characteristics which contribute heavily to cost growth should diminish in weapons of the future.

--The cost goal provides the discipline and the challenge which drive design-to-cost. Although considered flexible the cost goal has not been raised thus far on any of the systems.

--Although design-to-cost appears to hold out hopes for reducing weapon system acquisition costs, a reduction in expenditures for weapon systems should not be anticipated. Whatever savings accrue from lowering the acquisition cost presumably will be applied to purchasing additionally needed quantities of weapons.

--Since none of the weapon systems has yet seen any major production, firm conclusions as to the program's success, or recommendations for its improvement, would be premature.

GAO believes that a number of questions about systems designed to a cost must await further experience with the program, such as

--whether system acquisition costs have been reduced at the expense of higher operating and maintenance costs;

--whether design austerity, which could reduce a system's multimission and growth potential, would foster a proliferation of weapons to satisfy essentially similar needs;

--whether the pace of technological advancement will be slowed; and

--whether the military services would attempt to reinstate through subsequent costly modification programs performance features discarded in development because of high cost.

The Department of Defense said it plans to improve its collection of data on the cost of operating and maintaining weapon systems to permit extending the design-to-cost concept to cover such costs. The Department will be examining other questions raised by GAO as proposals for new or continued development of systems come before it for review.

CHAPTER 1

INTRODUCTION

The General Accounting Office (GAO) has reviewed the application of the "design-to-cost" concept to major weapon system acquisitions.

Weapon system acquisition costs have been increasing faster and at substantial rates over the past several years. Figure 1, prepared on data supplied by the services, shows the estimated unit cost of the latest generation of each of eight systems to run from one and a half to six times the cost of their predecessors. The cost increases would be larger were they to include inflation of recent years. For the increased cost, the Department of Defense (DOD) has been acquiring weapons with large-scale improvements in performance capability. The problem is that DOD has not been and will not be able to buy weapons in the quantities needed if this trend continues.

THE DESIGN-TO-COST-CONCEPT

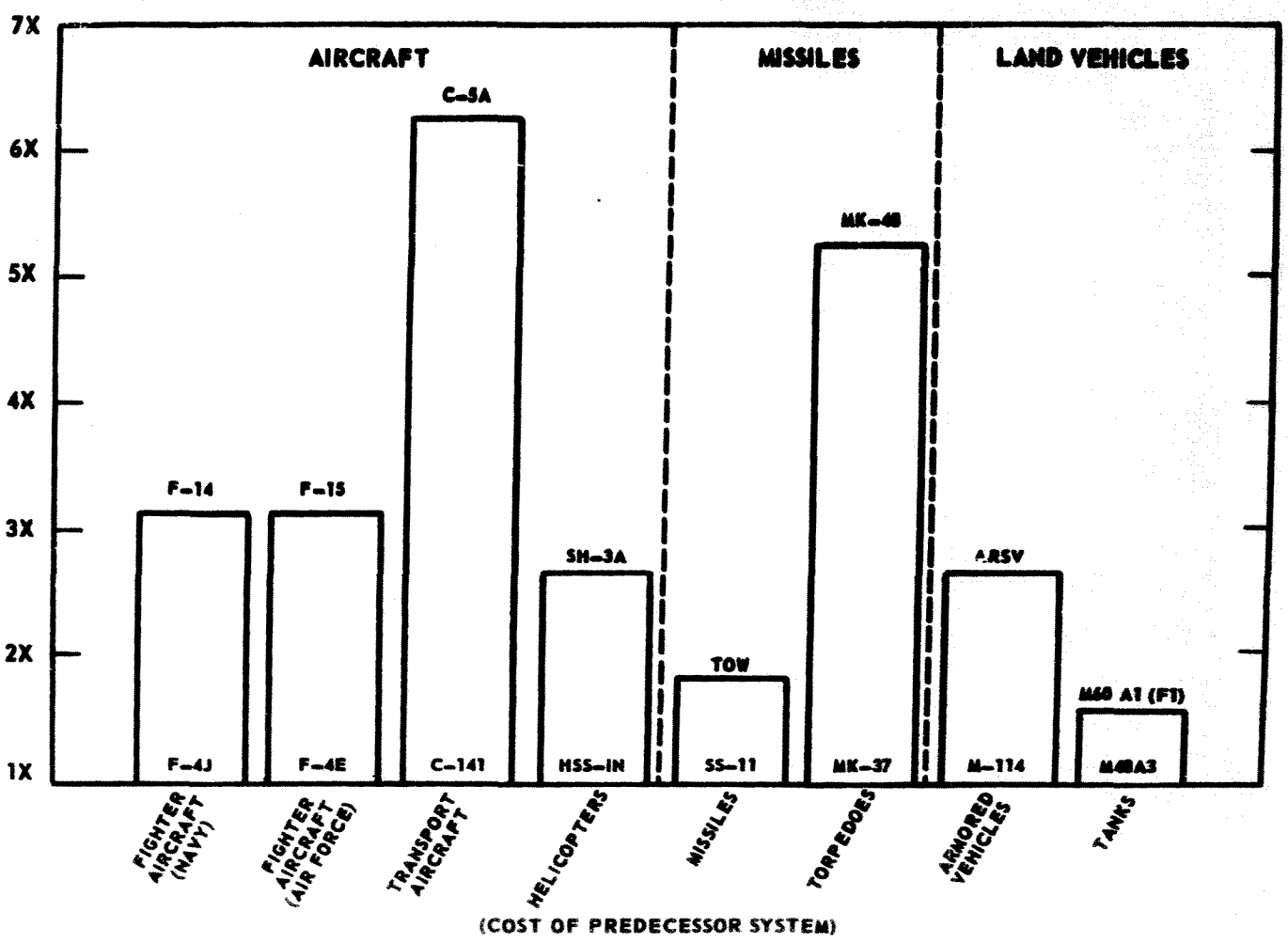
In 1971, DOD introduced the design-to-cost concept. This approach to acquiring major weapons systems considers a weapon's cost equally with its performance. DOD hopes to control cost growth and hold weapon system costs to affordable levels by designing capable systems to a predetermined cost. The cost goal would be set high enough to provide at least the minimum essential performance requirements and yet permit procuring the quantities needed. Design-to-cost is now applied in the development of all major weapon systems except for a few where national security dictates assigning a higher priority to performance than to cost.

Establishment of cost goals

The first step in designing to cost is to establish a unit cost goal. The goal is what DOD is willing to pay and believes it can afford (i.e., the Congress will provide the necessary funds) for a unit of military equipment meeting established performance requirements. The unit cost goal is pegged to a rate at which a contractor can produce the quantity the Government plans to buy during a specified period of time.

A simple illustration would be one in which the Government plans to buy 540 aircraft deliverable over a 3-year period at a rate of 10 a month in the first year, 15 a month in the second year, and 20 a month in the third year. The

FIGURE 1
REPRESENTATIVE COST DIFFERENCES BETWEEN PAIRS OF SUCCESSIVE WEAPON SYSTEMS 1960–1970'S [1]
(CONSTANT YEAR DOLLARS)



[1] Source: Data provided to GAO by the U.S. Army, Navy and Air Force.

unit design-to-cost goal is established at $3 million. Minimum performance requirements such as speed, takeoff distance, and firing accuracy, are also established.

This information would be provided to the developing contractor whose objective would be to design a plane producible at an average unit cost of $3 million for the 540-plane production run. The lots produced later in the run would undoubtedly cost less than the earlier lots because efficiency would increase as production progressed. Obviously the estimated learning curve to be experienced during production must figure prominently in establishing the goal and forecasting whether or not the design-to-cost objective can be achieved.

The goal is generally thought of as applying to the total system although major subsystems may have their individual cost targets (referred to as unit production cost goals). The goal is usually expressed as the average unit flyaway cost (rollaway or sailaway for vehicles and ships) in accordance with DOD budget guidance. 1/ All goals are stated in constant year dollars.

Tracking cost during development

Tracking progress towards achieving the design-to-cost objective has several specific purposes. It provides an opportunity for ascertaining periodically whether the design can be produced within the preestablished goal. It can signal a problem in time to permit corrective action. Finally, it provides a historical record of what transpired.

When the tracking system warns that the weapon as currently designed might not be producible within the cost goal, and additional changes in design are not practical, decisions trading off some performance may become necessary. If there is no room for performance trading, the alternatives are for the Defense Systems Acquisition Review Council (DSARC) to

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1/Flyaway cost includes the cost of the basic unit to be fabricated (airframe, hull, chassis, etc.), including "start-up" costs, the propulsion equipment, electronics, ordnance, and other installed Government-furnished equipment. It does not include procurement costs, such as ground support equipment, training equipment, publications, technical data, and contractor technical services.

recommend raising the cost goal or canceling the program. 1/

DOD policies and guidance

Designing to a cost target is not new. It is accepted practice in American industry although here, competition also plays a large part in setting the design limitations. The concept's application to a wide range of defense programs is, however, a new approach to the acquisition of major weapon systems.

The initial DOD pronouncement on design-to-cost, contained in DOD Directive 5000.1 issued in July 1971, contemplated designing weapon systems to life cycle costs, but present difficulties with forecasting these costs precluded this. It is, therefore, not surprising that the implementing regulations and guidelines which followed the publication of DOD Directive 5000.1 were directed specifically towards acquisition costs. The most often used published guidance on design-to-cost is the Joint Design-to-Cost Guide issued by DOD in October 1973.

Interest in the design-to-cost concept remains high. There have been frequent symposia on the subject sponsored by DOD and by various industry associations. We anticipate that this interest will continue until it can be demonstrated whether or not the program can provide practical benefits.

STATUS OF DESIGN-TO-COST

Design-to-cost is not used where a weapon's performance is so critical, and delivery is of such priority, that it is inimical to the national interest to impose a cost constraint. Another exception to its use is a case in which only a few units are to be produced.

As of December 1974, there were 54 major weapon systems in the acquisition cycle that had not reached the production phase. Of these, design-to-cost goals were established for 26, and will be established for 22 others, before they reach the full-scale development phase. The remairing six will not

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1/DSARC is the highest level advisory council in DOD on system acquisitions. It reviews major weapon programs at specific intervals and recommends to the Secretary of Defense whether they should proceed into the next phase of development or into production.

be designed to cost. Five were already in advanced stages of development, and the other was a unique communication system where design-to-cost was not considered appropriate.

To date, design-to-cost goals have been established at varying points in the acquisition process. Some systems were early in concept formulation, while others were well along in the development phase when the goal was established. This situation was unavoidable because of the different stages the systems were in when the decision was made to implement design-to-cost on a grand scale.

In the future, DOD plans to establish a goal as soon as it is practical to do so. Generally, this would be near the end of the concept formulation phase after the system's characteristics have been defined but before the contractor's involvement.

SCOPE OF REVIEW

We discussed the concept and its implementation with DOD officials and obtained the views of several contractors experienced in programs where design-to-cost was practiced.

We made a detailed examination of design-to-cost's application to one weapon system in each of the three military services. The three systems were the A-10 close air support aircraft (Air Force), the XM-1 main battle tank (Army), and the patrol frigate surface escort ship (Navy).

In addition, DOD provided us with certain information requested on 10 other weapon systems to which design-to-cost was being applied.

CHAPTER 2

IMPLEMENTING DESIGN-TO-COST

Over the years there has been increasing criticism of the DOD weapon system acquisition process because the critics believed that most, if not all, systems were overly sophisticated and designed to performance requirements that were not needed.

With the introduction of the design-to-cost concept weapon system managers are moving away somewhat from the practice of seeking maximum performance in every system to one where the weapons will essentially provide only what is needed. Policymakers, project managers, and design engineers are giving priority attention to the cost implications of weaponry improvements. Therefore, design-to-cost should reduce the incidence of costly but unnecessary performance characteristics in weapons of the future.

MEASURING ACCOMPLISHMENTS OF DESIGN-TO-COST

Establishing a cost goal and attempting to design a system within the goal provide the discipline and the challenge which drive design-to-cost. But achieving the goal is not a good or even a practical measure of its successful application to a specific system.

For one thing there are problems in setting a reasonable cost target. In most cases, a new weapon system usually contains some elements for which only a limited amount of historical cost experience is available. Imprecisions inherent in estimating the cost of these elements could result in a target set too low, complicating attempts to meet it. Conversely, they could result in a target cost which is too high, reducing the incentive for employing innovative engineering such as would be required to meet a tighter target. Moreover, a weapon's cost goal is determined not only by estimating the production cost but also by considering the amount the service feels it can afford to pay. This amount may prove lower than the minimum cost to produce an acceptable weapon.

Also, there is the problem of confirming that a system has met the cost goal before some production experience becomes available. Contractors are required, during certain stages of development, to demonstrate to the services' satisfaction that their systems have met the goal. Here, too, there are too many imponderables to permit a conclusive finding to be made.

Finally, since the acquisition cycle spans several years, events occurring during this period are likely to alter earlier plans. Changes in threat, battle concepts, or technology, for example, could force revisions in the weapon's configuration, in the total quantities to be bought, or in the rate at which they are acquired. Revisions of this nature would affect the unit production cost and it would then be impossible to make meaningful comparisons between the new unit cost and the original cost goal.

A more valid barometer for measuring the effect of designing systems to a predetermined cost might eventually be provided by comparing the production cost of systems designed under the concept with the cost of systems they are to replace. If design-to-cost is working as expected there should be fewer instances of spectacular cost growth such as was evidenced in the past. (See p. 2.)

From the evidence thus far it would appear that design-to-cost would tend to reduce weapons costs. Contractors we interviewed have endorsed the concept virtually without qualification and were critically examining their own design changes for their effect on cost before incorporating them into the system. Frequently changes were rejected because they were considered too costly.

FLEXIBILITY OF COST GOALS

To maintain the integrity of the design-to-cost concept the incidence of changes in the cost goals should be kept at a minimum. Frequent changes can undermine confidence in the process. Contractors who lost out in the competition can be led to wonder whether they could not have met the performance requirements within the original cost goal had their prototype been selected. Rightly or wrongly, suspicions might arise that contractors seeking to have the cost goal raised may have "bought in."

Some flexibility has been provided for exceeding the goals. For example, in addition to the design-to-cost goal, DOD has established cost thresholds recorded in the system's development concept paper, DOD's primary management document which contains information considered in major decisions such as cost and performance, technical risk, and projected funding levels. In some cases the design-to-cost goal is less than the development concept paper cost threshold. The Navy's Sea Control Ship's design-to-cost goal is $100.2 million, for example, but the development concept paper established a threshold of $128 million. Actual or potential breaching of the threshold acts as a trigger for

reevaluation of a program by Defense officials and can result in performance trade offs, increase in the threshold or, in extreme cases, program cancellation.

Considering the difficulty of estimating major weapon system costs with precision, this flexibility is desirable in the event it becomes impractical to make further trade offs. On the other hand, it should be kept in mind that the reason for instituting design-to-cost was to preclude buying systems that DOD could not afford. Therefore, the effect on funds available for purchasing needed quantities of other systems has to be considered before allowing any system's cost goal to be raised.

For the 13 systems on which we obtained cost information 12, as presently designed, are still reported by DOD to be producible for their intended unit cost except for inflation. The lone exception is the lightweight fighter--an outgrowth of a prototype development program which is to be the basis for the Air Force advanced combat fighter. This system's increased estimated cost stems primarily from an increase in engine cost and from additions to the avionics. We understand that raising the cost goal will be considered at the next DSARC review.

The A-10 is another system where the cost goal might eventually be raised. The goal is $1.5 million (in 1970 dollars) for a planned buy of 600 aircraft. However, a second estimate prepared by the DOD's Cost Analysis Improvement Group, amounting to about $1.7 million, is being used for reporting purposes in the selected acquisition report and in programing documents. At a DSARC review in November 1974 the Air Force reported that the current estimated unit cost in terms of 1970 dollars had reached $1.77 million, primarily because of additions to the avionics.

THE CHANGING APPROACH TO DESIGNING WEAPONS

The approach to designing a weapon to a predetermined cost necessarily means keeping a watchful eye on alternative engineering concepts that might affect the weapon's cost. Engineers who were not previously concerned about cost have been forced into becoming cost conscious. During the development of the A-10, for example, the contractor's project manager turned back numerous design changes proposed by company engineers on the ground that they would add too much to the weapon's cost.

The changing philosophy is also evident in the early planning stages of development when the services set

performance requirements. In planning the configuration of the patrol frigate the Navy decided to forego options for future characteristic changes that might be proposed because of changes in threat, new developments in weaponry, etc. This approach has inherent dangers, also, because Navy ships normally have a 25- to 30-year life, and decisions of this nature could severely limit their useful life.

The XM1's capabilities were scaled down from those sought in an earlier tank program which was terminated by the Armed Services committees because of its potentially high cost. The committees favored a tank which would be less sophisticated and less costly and these constraints resulted in eliminating certain features such as missile-firing capability, an automatic loader, and a driver in the turret. An additional effort to hold down costs was made by incorporating several proven components or subsystems already in use on older tanks.

Design changes and trade off decisions

Contractors emphasize the importance of the services refraining from imposing narrow performance parameters. This is to provide sufficient flexibility for making design changes which may become necessary in order to keep costs below the level of the cost goal. If cost trends indicate that the system cannot be produced within the goal, some trade off in desired performance may be necessary. Trade offs which should result in changes to the important performance specifications must be approved by DOD.

One interesting tactic which may inadvertently serve as a brake on trading off performance is the introduction of competition during development. The XM-1 tank, in which two contractors are developing prototype vehicles is an example. The contracts contain a priority listing of 16 items which may be considered for trading off. Presumably, neither contractor knows what the other is doing but they know that only one--the contractor delivering the better prototype in terms of costs and performance--will be chosen for full-scale development and production. Consequently, there is a great incentive to meet many of the performance specifications while staying within the cost goals.

Tracking weapon system costs complicated by inflation

The process of tracking costs is complicated by inflation because continuing inflation forces frequent

changes in the estimated cost. Furthermore, measures of the impact of inflation on a specific system are imprecise, at best.

Costs, which are maintained at current values, must be converted to the values prevailing in the year the cost goal was established. In the case of the A-10 the factors used to make this conversion were taken from Bureau of Labor statistical indexes. This was also the case with the XM-1 but, there, some factors were also derived from labor rates contained in union contracts.

The Navy does the tracking for the patrol frigate since the contractor had no role in implementing design-to-cost in that program. The Navy used several methods to deescalate costs of Government-furnished equipment, contractor-furnished equipment, and the basic ship construction for the patrol frigate. The procedures were complicated but the final result was close to the design-to-cost goal.

MOTIVATING CONTRACTORS TO REDUCE WEAPON SYSTEM COSTS

DOD has employed a number of approaches including incentive fees to attain the cost goal, to motivate contractors to look for ways to minimize weapon system costs.

The predominant incentive for contractors remains, as always, obtaining the production contract. Contractors realize there may be no production contract unless they design the system to a cost the Government can afford to pay. However, it must also be understood that profits are largely a function of cost and the profit motive acts as a disincentive to reducing costs substantially.

CHAPTER 3

INTERACTION WITH ESTABLISHED ACQUISITION PRACTICES

Design-to-cost could have an important effect on more established system acquisition practices and its interaction with these practices may bear watching.

EFFECT ON SYSTEM LIFE CYCLE COSTS

When selecting a system for development or production the purchase price of the system and the cost to operate and maintain it throughout its life cycle should be considered. One system may appear to be a better buy than an alternative one because its acquisition cost is less. But the cost to operate and maintain it may be high enough to negate its initial cost advantage and could also limit its effective use because of frequent breakdowns.

There have been discussions in DOD about extending design-to-cost to include life cycle costs. The biggest hurdle has been the difficulty of estimating these costs, particularly for systems involving considerable new development. DOD is now working on a system for collecting weapon system operating and maintenance costs to help provide this estimating capability. If DOD can achieve this capability contractors could be given a cost goal which would consider life-cycle costs.

With the current emphasis centered on the acquisition cost it is possible that contractors may be forced into using cheaper production methods or materials in order to meet the cost goal. In doing so they may be building higher maintenance and parts replacement costs into the system. Conversely, the need to achieve the cost goal may lead to simplified designs which could facilitate maintenance and reduce maintenance labor costs.

SYSTEM VERSATILITY

In the past some weapons have been designed with a multimission or multiservice capability through the addition of extra characteristics. The F-15's wings, for example, have been strengthened considerably to provide it with a bomb-carrying capability. Many systems have been designed for growth potential by providing more space or weight than needed at first. Subsequent improvements were made through relatively low-cost modifications which took advantage of the overdesign.

Such additions and provisions for subsequent improvements have driven up the cost but have added to the weapons' use. Where the extra capability is valuable it could represent a worthwhile investment. Design-to-cost may limit opportunities to design weapons with built-in growth potential. It may also reduce instances where a weapon is designed to carry out more than a single mission or satisfy multiservice needs and could lend impetus to the services' developing their own weapons to satisfy essentially similar needs.

EFFECT ON TECHNOLOGICAL ADVANCES

The search for ever-improving performance which marked past weapon system development was generally accompanied by intensive research and development efforts in Government and industry laboratories. With the introduction of design-to-cost engineers are turning more of their attention to reducing producibility costs of new design features. With this commitment to designing affordable systems, engineering innovativeness could be inhibited, slowing the pace of major technological breakthroughs.

INCREASE IN COSTLY PRODUCT IMPROVEMENT PROGRAMS

Some costly performance characteristics will undoubtedly be abandoned in order to stay within the design-to-cost goal. Some of these will be personally favored by individuals in the services who may regard them as too important to do without. It is possible that they will enlist sufficient support for reinstating, through subsequent product improvement programs, system features discarded earlier because of high cost. If the practice becomes prevalent it could undo the advantage of designing a system to cost.

CHAPTER 4

CONCLUSIONS

Design-to-cost has been in existence for about 4 years. None of the weapon systems to which it was applied has yet resulted in much production. Therefore, it is too soon to know whether contractors will succeed in designing systems which meet the performance objectives and, yet, can be produced at a cost within the goal established as a target. Much will depend on military program advocates not pressing for unnecessary increases in performance or for increased sophistication. Nevertheless, to the extent that it has brought about an increasing cost consciousness in the weapon system acquisition community, design-to-cost offers excellent prospects for reducing the cost of acquiring new weapon systems.

This does not mean that one should anticipate a reduction in total expenditures for weapon systems. A principal objective of design-to-cost is to reduce unit production costs to permit purchasing weapons in greater quantities. The effect, if any, on the total defense procurement budget may be rather small, particularly in light of the inflationary spiral of recent years. It is unfortunate that design-to-cost came into existence at a time when inflation's effect on weapon system costs has become so devastating that a comparison of current cost estimates with the design-to-cost goals could easily obscure the efforts made to hold down cost.

A number of questions about design-to-cost remain. The answers to these must await more experience with systems produced under the concept. They concern such matters as

--the effect on life cycle costs;
--system versatility;
--the effect on technological advances; and
--increases in product improvement programs.

Further experience with design-to-cost is needed before its effect on these and other matters can be discerned. We intend to continue our evaluation of this concept in a subsequent review. At that time we will assess the potential for applying design-to-cost in acquisitions by other Government agencies.

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The Director of Defense Research and Engineering, in responding to this report, stated that a comparison of the cost of a new weapon system with the cost of its predecessor should take into account the new system's increased capability. We agree, and we do not wish to imply that the value in improved performance may not be commensurate with the higher prices paid for the newer systems. Our purpose in presenting such comparisons (see fig. 1, p. 2) is to illustrate that current weapon system costs have risen sharply, not only for reasons of inflation but, also, because of the continuous striving for improved performance. It was the realization that, left unchecked, this approach to developing new systems could reduce the overall effectiveness of our force structure which led to instituting design-to-cost.

The Director said that some steps are being taken to resolve some of the questions we have raised about design-to-cost and made these specific points.

--A start has been made towards improving the collection of weapon system operating and support cost data to permit extending the design-to-cost concept to cover life cycle costs.

--DSARC is examining multimission or multiservice possibilities of systems coming before it for review. Similarly, it will review proposed major modifications to weapon systems.

--Major emphasis will be placed on using technology to reduce costs rather than to increase complexity or gold-plating which, in the past have driven them upwards.

(See app. II for the full text of the Director's response.)

APPENDIX I

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON, D. C. 20301

25 APR 1975

Mr. R. W. Gutmann, Director
Procurement and Systems
Acquisition Division
General Accounting Office
Washington, DC 20548

Dear Mr. Gutmann:

The Secretary of Defense has asked me to respond to your letter of 19 March 1975 which forwarded the draft report on "Application of Design-to-Cost Concept to Major Weapon Systems Acquisition" (OSD Case #4046) for DoD review and comment.

The report portrays the basic thrust of the Design to Cost application to major systems acquisition, the problems we face and what we hope to obtain from the program. The DoD considers Design to Cost a most important discipline in the management of defense systems and appreciates the interest evidenced by the GAO in your report.

Some of the statements and conclusions in the report are incomplete and the following comments are submitted to help avoid possible misinterpretation of the Design to Cost concept. The significant comments are included below and minor recommendations for clarity and correctness have been included as an attachment.

The objective of Design to Cost is twofold: to establish cost as a design parameter on an equal basis with performance and schedule, and to provide acquisition managers and contractors with cost goals to achieve the best possible balance between affordable life cycle cost, acceptable operational performance and timely introduction into service. To imply that its purpose is simply to reduce cost or to reduce cost to permit purchasing weapons in greater quantities does not accurately convey the true objective of the concept.

[See GAO note, p. 17.]

APPENDIX I

The report suggest that a more valid barometer of Design to Cost might be provided by comparing cost of systems to cost of predecessor systems performing similar missions. While Figure 1 does broadly illustrate the cost trend of weapon systems performing similar missions over the past ten years, it cannot depict the military utility of the system reflecting new requirements which in turn impact system cost. When a new system, albeit with similar mission, has a needed capability which far exceeds that of a predecessor system, a simple cost comparison can be more misleading than informative. Design to Cost may cause a narrowing of the gap as suggested; however, a true evaluation of the program can only be obtained from systematic analyses of all factors affecting the design of each system. Increased system performance will almost certainly continue to be the primary unit cost driver.

The report pointed out that the lightweight fighter was the one exception to systems reported to be producible to their intended unit cost. The DSARC review is not completed at this time, however, it should be noted that the lightweight fighter was a prototype technology development program designed to realistic but hypothetical performance specifications. The Air Force Advanced Combat Fighter is a missionized weapon system based on these prototypes, intended to be introduced into the total force structure. The Air Force has requested that the Design to Cost Goal be increased to include the costs of the increased weapon system capability.

[See GAO note, p. 17.]

The questions raised by the report concerning the effects of Design to Cost are both real and timely. Absolute answers to these questions cannot be determined at this time; however, steps are being taken to resolve them. A task force has been organized to improve our collection and processing of operating and support cost data necessary to extend the Design to Cost concept into this area. Systems are continually examined for possible multimission and multiservice use by our DSARC review process which will also review large modifications to weapons systems in a similar manner.

The effects on technological advances are an unknown; however, we anticipate that more effort will be necessary in basic research and exploratory development to maintain the technological base to support continued progress. Major emphasis will be placed on the use of technology for reducing costs as opposed to increasing complexity and/or goldplating, as has often been the case in the past.

Should you desire further information or discussions on this important subject, please feel free to call on me or members of my staff.

Malcolm R. Currie

Attachment

GAO note: Portions of this letter have been deleted because they are no longer relevant to the matters discussed in this report.

PRINCIPAL OFFICIALS

RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES

DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
DEPARTMENT OF DEFENSE		
SECRETARY OF DEFENSE:		
James R. Schleshinger	July 1973	Present
Vacant	May 1973	June 1973
Elliott L. Richardson	Jan. 1973	May 1973
Melvin R. Laird	Jan. 1969	Jan. 1973
CHAIRMAN, JOINT CHIEFS OF STAFF:		
General George S. Brown	July 1974	Present
Admiral Thomas H. Moore	July 1970	June 1974
DIRECTOR, DEFENSE RESEARCH AND ENGINEERING:		
Dr. Malcom R. Currie	June 1973	Present
Dr. John S. Foster, Jr.	Oct. 1965	June 1973
DEPARTMENT OF THE ARMY		
SECRETARY OF THE ARMY:		
Howard H. Callaway	May 1973	Present
Robert F. Froehlke	July 1971	May 1973
DEPARTMENT OF THE NAVY		
SECRETARY OF THE NAVY:		
J. William Middendorf II	June 1974	Present
John W. Warner	May 1972	Apr. 1974
John H. Chafee	Jan. 1969	Apr. 1972
DEPARTMENT OF THE AIR FORCE		
SECRETARY OF THE AIR FORCE:		
Dr. John L. McLucas	July 1973	Present
Dr. Robert C. Seamans, Jr.	Feb. 1969	May 1973