

**DOCUMENT RESUME**

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Review of Life Cycle Cost Concept. PSAD-78-74; B-163058. March 2, 1978. 9 pp.

Report to Secretary, Department of Defense; by Richard W. Gutmann, Director, Procurement and Systems Acquisition Div.

Contact: Procurement and Systems Acquisition Div.

Budget Function: National Defense: Department of Defense - Procurement & Contracts (058).

Organization Concerned: Department of the Air Force; Department of the Army; Department of the Navy.

Congressional Relevance: House Committee on Armed Services; Senate Committee on Armed Services.

A former report, "Life Cycle Cost Estimating--Its Status and Potential Use in Major Weapon System Acquisitions," included recommendations that the Department of Defense explore approaches to accumulating ownership costs for systems under development and standardize costs elements included in life-cycle costs (LCC) estimates. Actions have been initiated encouraging the use of LCC considerations in decisionmaking, but progress has been slow. Issuance of guidance and operating and support (O&S) costs accumulation and reporting has been spotty, and the effect of initiated actions is just being recognized. Issues requiring attention are: accountability for meeting O&S cost goals is unclear, assumptions for developing O&S estimates are not updated to show changes in program requirements, O&S estimates are not reported to the Congress, costs of O&S data are not compared to benefits, and more LCC training is needed. To make LCC a viable factor in controlling O&S costs, the Secretary of Defense should: accelerate efforts to provide uniform and standard costs definitions and cost-estimating guides, hold program managers accountable for O&S costs, require systematic updating and reporting of LCC estimates, and provide program managers expert cost analysts to assist in LCC decisions and tradeoffs. (HTW)



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UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

PROCUREMENT AND SYSTEMS  
ACQUISITION DIVISION

MAR 2 1978

B-163058

The Honorable  
The Secretary of Defense

Dear Mr. Secretary:

In a December 30, 1974, report to the Congress, "Life Cycle Cost Estimating--Its Status and Potential Use in Major Weapon System Acquisitions" (PSAD-75-23), we emphasized that when making development decisions, more consideration should be given to ownership costs for the life span of a weapon system. These costs, characterized as operating and support (O&S) costs, when added to weapon design, development, and acquisition costs, constitute life-cycle costs (LCC).

We recommended that the Department of Defense (DOD) (1) explore approaches to accumulating ownership costs for systems under development and (2) standardize cost elements included in LCC estimates.

In the 1974 report we mentioned that DOD had made a satisfactory start toward these objectives. Specifically, DOD had created a task force to develop systems for collecting ownership costs and assigned to specific organizations, the responsibility to furnish comprehensive guidance to the military services on how to make LCC estimates. Subsequent to our report, other actions were initiated encouraging the use of LCC considerations during the decision process.

Although interest is growing, especially at high management levels, progress has been slow in implementing the LCC concept. Issuance of guidance, and O&S cost accumulation and reporting has been spotty. The effect of initiated actions is just being recognized. Unless a more concerted effort is made, the full benefits to be derived from life-cycle costing will not be realized.

In following up on the status of the actions taken, we have noted several potential issues that warrant your

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attention. These issues are listed below and are discussed in this letter.

- Accountability for meeting O&S cost goals is unclear.
- Assumptions for developing O&S estimates are not updated to show changes in program requirements.
- O&S estimates are not reported to the Congress.
- Costs of O&S data are not compared to benefits.
- More LCC training is needed.

In conducting our followup work, we examined LCC policies, procedures, and guidance issued by the Office of the Secretary of Defense (OSD) and the services. We also looked into the A-10, F-16, and F-18 programs to see how O&S costs are managed. Although an Army system was not included in this survey, we did discuss the Army's LCC program with cognizant Army and OSD officials.

#### STATUS OF ACTIONS MENTIONED IN OUR DECEMBER 1974 REPORT

The following paragraphs discuss the actions that have been initiated by DOD, addressing the concerns raised in our December 1974 report on life-cycle costing.

#### O&S cost guides

The Cost Analysis Improvement Group has been asked to develop uniform cost-estimating criteria to help the services prepare for Defense Systems Acquisition Review Council reviews. These guides define cost elements and prescribe O&S cost-estimating methods. The first guide, for aircraft systems, was issued in July 1974. An update is in process. The cost group issued a draft guide dated May 1976 for ships, and plans to issue guides for missiles, combat vehicles, and electronics. Developing and issuing these guides takes several years, and effort is needed to finalize these guides and distribute them to users.

#### O&S cost visibility

A task group has been formed to provide visibility and management of support costs. This group was formed in January 1974 to accumulate and report O&S costs by weapon system/

subsystem and to standardize cost definitions of the services. Each service has identified aircraft O&S costs with mixed success. The Air Force and Navy officials said they are expanding their efforts to other types of weapon systems. Only the Navy has successfully reported O&S costs at the subsystem level.

According to OSD officials, the Air Force and the Navy submitted aircraft operating and support cost reports to the task group for 1975 and 1976. DOD's review of the later reports was not completed at the time of our survey, but some problems were identified. The problems are:

- Air Force and Navy field people incorrectly used O&S cost elements prescribed in the Cost Analysis Improvement Group's guide issued in July 1974. The Air Force has converted to the cost group format since the earlier report, and the Navy is currently in the process of converting.
- Frequent changes in accounting systems adversely affected the reports and continue to be a problem.

According to OSD, the Army has not submitted acceptable operating and support cost reports to the visibility and management task group. Army officials told us that Army accounting systems are not designed to accumulate costs by weapon system. Therefore, visibility and management requirements have not been implemented. The Army conducted a survey to determine potential users of the data and their needs. They believe this survey to be a prerequisite to developing a useful system. Even though the Army has summarized O&S cost data for selected aircraft in two annual reports, OSD has rejected the reports each year because (1) the data could be misinterpreted by users, (2) the Army method tended to underestimate several key cost elements, and (3) the data was based on estimates instead of actual costs.

LCC-RELATED ACTIONS INITIATED  
SUBSEQUENT TO THE DECEMBER 1974 REPORT

There appears to be, at high management levels within DOD, a conscientious interest in using LCC in acquisition-related decisions of major weapon systems. The individual program offices are giving some consideration to O&S costs as a part of acquisition management.

Actions by top management

As part of an April 1977 reorganization of the Office of the Secretary of Defense, responsibility for LCC policy and related O&S cost-reduction efforts was transferred from the Assistant Secretary of Defense (Installations and Logistics) to the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics). It is too early to assess the impact of this change on LCC policy issues.

Previously issued policy directives generally recognize LCC as an integral part of the acquisition process. No specific guidance, however, for accounting for or controlling O&S costs has been issued. A draft directive formalizing O&S cost-management principles into DOD policy requires

- improving O&S cost estimating capabilities for use in goal setting and OSD program reviews,
- assessing and reporting on the impact that significant program decisions have on total O&S costs and on the readiness of military units, and
- performing design and logistics tradeoffs.

According to OSD officials, the O&S draft policy may be delayed some months as a result of the reorganization. We believe a strong LCC commitment is necessary at the DOD policy level, and we urge you to expedite issuance of the policy directive.

Another action related to LCC was taken by the Deputy Secretary of Defense on February 28, 1976. He requested the services (1) establish O&S cost goals for each system under development and (2) measure progress toward achieving the goals to reduce those resources devoted to O&S. Progress reports were due about a year later. At the time of our survey only the Air Force had reported, showing O&S cost goals for 12 weapon systems. According to an OSD official, the Army and the Navy are still trying to establish O&S goals.

In addition to setting cost goals for weapon systems under development and in production, attempts are being made to control O&S costs in operational systems. For example, in August 1975 the Air Force established the office of Productivity, Reliability, Availability, and Maintainability within the Aeronautical Systems Division of the Air Force Systems Command. The major objective of the office is to reduce Air Force O&S costs for systems in operation without sacrificing system effectiveness.

The Air Force Logistics Command established an Acquisition Logistics Division in July 1976 to expand and strengthen interfaces between the logistics command and the systems command to improve the operational utility, field availability, and supportability of new systems while reducing O&S costs. The Air Force claims its efforts will reduce further O&S costs by more than \$28.6 million.

#### LCC efforts in program offices

The Air Force F-16 and A-10 and Navy F-18 program offices are not working toward specific LCC goals. Program offices have, however, involved contractors in life-cycle costing through contractual requirements and incentive awards. None of the projects we looked at had progressed far enough through the acquisition process to enable us to comment on the effectiveness of these efforts.

#### ISSUES FOR YOUR CONSIDERATION

The following issues were raised during our followup survey which, we believe, warrant your consideration.

#### Accountability for O&S costs

The Deputy Secretary's O&S cost-reduction program raised questions on the use of O&S cost goals. Several program officials wonder who is accountable if actual O&S costs exceed estimates. These officials stated that the O&S cost estimates were developed during the design phase and were based on assumptions valid at that time. A DOD or service change to the assumptions which affect system deployment may increase actual costs beyond the estimates. Program officials feel they should not be held responsible for O&S cost goals under these circumstances.

While program officials' concerns seem valid, we believe efforts must be made to impress upon them the value of LCC goals during the concept, design, and development phases of systems acquisition. LCC research indicates that by the end of the concept-formulation phase, 70 percent of the O&S costs are "frozen" into the system and increase to 95 percent by the end of the development phase. Unless program managers are held accountable for O&S costs--at least those elements closely related to system design and performance--opportunities for reducing these costs will be missed. To reduce O&S costs, therefore, tradeoffs must be made early in the acquisition cycle. Also, O&S goals can be changed to accommodate different circumstances.

O&S cost goals should be updated

As noted, DOD requires that O&S cost goals be established for each weapon system under development. Prudent management dictates a reevaluation of all factors if significant changes occur, such as total program requirements.

Of the three systems we looked at, O&S cost goals had been established for two. Neither system had goals based on current program requirements. In early 1977, for example, the F-16 program office established an O&S cost goal of \$14.6 million per squadron. A program officer said this estimate was based on a total purchase of 650 aircraft. Current program requirements indicate a planned purchase of 1,388 aircraft; however, program officials had not estimated what affect the changed requirements would have on the O&S cost goal.

We did not attempt to evaluate the impacts of the F-16 O&S cost goal, but we believe doubling the requirement could change the unit LCC. A major change in a program should trigger the need for new estimates. Making program managers accountable for O&S costs would alleviate this cost-estimate problem. Therefore, if O&S costs are made a part of the decision package, the manager would systematically adjust O&S estimates as basic program estimates are now adjusted.

O&S goals not reported to the Congress

Our prior report discussed DOD reluctance to include O&S cost estimates in the quarterly Selected Acquisition Reports (SARS) to the Congress. Many DOD officials have expressed concern that O&S cost figures in a SAR would be viewed as firm targets rather than estimates or goals subject to change. SAR's development and acquisition cost data are also estimates, however. We believe the system acquisition process will benefit by including O&S goals in the SARS.

Data costs not compared to benefits

Several officials were concerned about the expense of collecting detailed historical cost data which may not significantly improve cost estimates. Army officials were concerned about the extent of data collection required for the visibility and management task group. These officials felt that more data would be collected than could possibly be used effectively. For this reason Army officials have taken a "go slow" attitude.

On the other hand, Navy officials suggested that relatively few items account for most of a system's estimated O&S costs--about 15 percent of the items in some systems make up 85 percent of the O&S cost-estimate. These few high-cost items are called "cost drivers." Some DOD officials feel cost drivers should be isolated concentrating data-collection efforts on them. We tend to agree. The expense of data acquisition and maintenance on the larger number of items which comprise only a minor portion of O&S costs would, therefore, be avoided.

We did not explore the cost-benefit issue in depth, but the preceding comments raise the following questions: How much historical data is needed to improve cost-estimating accuracy? Should LCC estimates concentrate primarily on those few significant elements that tend to be cost drivers?

#### More LCC training needed

Applying LCC policy depends on how well users understand and accept it. DOD and service officials commented that more training is essential to achieve a consistent and comprehensive working knowledge of LCC.

One service command does not offer formal training to costs analysts, estimators, or other personnel involved in daily LCC processes. Another service prepared a training course but had difficulty locating a qualified instructor. Only four people had the necessary job experience to meet the course requirements, so the class was canceled.

According to DOD officials the training problem is aggravated by the absence of a cost-analyst career field with a career ladder and defined qualifications. One service assigned people to cost-analyst positions from eight career fields, without regard for education, work experience, and career plans.

Management cannot fully recognize or appreciate the implications of major LCC decisions and tradeoffs without a clear understanding of LCC concepts and applications. We believe LCC training is essential to effective LCC decision-making and should be provided to all DOD users who need it. We believe DOD should explore establishing cost analysis as a separate career field with stated entry levels and advancement opportunities.



CONCLUSIONS AND RECOMMENDATIONS

There is a strong commitment to LCC at the highest DOD and service levels, but additional benefits will not become available until LCC users are also committed. The commitment may take some time. We acknowledge the complex problems associated with implementing LCC, yet we believe the concept is worthwhile and deserves your continued support to promote its widespread use. To make LCC a viable factor in controlling O&S costs, we recommend that you

- accelerate efforts to provide uniform and standard cost definitions and cost-estimating guides,
- hold program managers accountable for O&S costs-- at least those elements closely related to system design and performance,
- require systematic updating and reporting of LCC estimates,
- provide program managers expert cost analysts to assist in LCC decisions and tradeoffs, and
- explore cost analysis as a separate career field with stated entry levels and advancement opportunities.

We intend to periodically review DOD's efforts in improving life-cycle cost concepts. We appreciate the time and assistance given us during this survey.

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As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this letter to the Acting Director, Office of Management and Budget; the Chairmen, Senate and House Committees on Appropriations and Armed Services; the Chairmen, Senate Committee on Governmental

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Affairs and House Committee on Government Operations;  
and the Secretaries of the Army, the Air Force, and the  
Navy.

Sincerely yours,

A handwritten signature in black ink, appearing to read "R. W. Gutmann". The signature is written in a cursive style with a prominent initial "R" and a long horizontal stroke extending across the middle of the name.

R. W. Gutmann  
Director