

DOCUMENT RESUME

01130 - [A1051686]

[Effective Use of Systems Analysis in the Navy's Decisionmaking Process]. PSAD-77-90. March 14, 1977. 6 pp.

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

Issue Area: Federal Procurement of Goods and Services (1900).

Contact: Procurement and Systems Acquisition Div.

Budget Function: National Defense (050); National Defense: Weapon Systems (057).

Organization Concerned: Department of the Navy.

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

Systems analysis can play an important role in the decisionmaking process by providing objective and timely information. The proper role for systems analysis is not to dictate decisions, but to clarify issues and their possible consequences. GAO studied eight aircraft, two airborne sensor programs, and certain aspects of ship programs as they related to the aircraft systems reviewed. The objective was to assess the quality and usefulness of information available to the decisionmaker. Findings/Conclusions: Systems analysis could have provided Defense decisionmakers with early answers to judgmental questions in the SH-2D/P and SH-3H modification programs and in the Sea Control Ship Program. However, the questions were still unanswered after a full-scale development decision in the second case, and after system deployment in the first. There is a lack of information on the capabilities of various alternative systems in a combined force with other weapons systems. Some combined force studies had serious flaws which created an environment of debate over the merits of the study rather than an atmosphere of evaluation for decisionmaking. When program initiation is being considered in systems analysis, information is needed to determine that: the military requirements properly relate to the mission, to the threat to be countered, and to the overall effectiveness of forces; alternative systems have been considered; mission performance requirements are adequately defined; and practical tradeoffs among performance risks, cost and schedule have been considered. Recommendations: The Navy should issue instructions requiring a master plan for systems analysis which would provide timely information at Defense Systems Acquisition Review Council decision points. Applying such instructions to individual weapon system programs should: define the authority, responsibility, and timing for systems analysis to provide information for the decisionmaking process; and provide a planning and management tool which, along with the existing testing master plan, would help managers make objective decisions. (Author/CN)

01130



UNITED STATES GENERAL ACCOUNTING OFFICE

WASHINGTON, D.C. 20548

PROCUREMENT AND SYSTEMS
ACQUISITION DIVISION

MAR 14 1977

The Honorable
The Secretary of Defense

Dear Mr. Secretary:

In a review of the impact of systems analysis on the acquisition of Naval aircraft (assignment code 951142), we found a number of factors exist which limit the effective use of systems analysis in the Navy's decisionmaking process. The need for improvement was particularly noted during the early phases of the acquisition process when aircraft system concepts are formed and validated prior to full-scale development. Although investments are low at this point, decisions made could affect about 95 percent of the weapon systems' lifetime costs.

The role of test and evaluation, supporting program reviews at major decision points in the acquisition process, has been formalized. No similar steps, however, have been taken for systems analysis. We believe that such steps should be taken to maximize the benefits which can be achieved from systems analysis.

We recommend that you direct the Navy to issue instructions, similar to those existing for test and evaluation, which will define the authority, responsibility, and timing for systems analysis in support of major decision points in the acquisition process.

INTRODUCTION

Decisionmakers are faced with a difficult situation caused by the increasing capabilities of potential enemy weapons and the rising costs of systems to counter them. Decisionmaking is further complicated by constraints such as budget schedule pressures, and limited test resources. Systems analysis can play an important role in the decision-making process by providing objective and timely information. The proper role for systems analysis is not to dictate decisions, but to clarify issues and their possible consequences.

PSAD-77-90

We studied eight aircraft, two airborne sensor programs, and certain aspects of ship programs as they related to the aircraft systems reviewed. Our objective was to assess the quality and usefulness of information available to the decisionmaker. The programs were selected because (1) they were major acquisitions requiring top level management attention, and (2) they collectively represented a view of the various phases of the acquisition cycle.

SYSTEMS ANALYSIS NEEDED PRIOR TO FULL-SCALE DEVELOPMENT

The Navy recognizes the benefits of good systems analysis in decisionmaking. However, in some cases, needed studies were not done, were delayed, or lacked sufficient scope.

Following are two examples where systems analysis could have provided Defense decisionmakers with early answers to judgmental questions. The questions were still unanswered after a full-scale development decision had been made in one case, and after system deployment in another.

--The SH-2D/F and SH-3H modification programs, costing about \$600 million, are examples of CNO's emphasis on "quick reaction/interim" efforts done under cost and schedule pressure. Both programs were managed similarly and exhibited similar planning deficiencies, i.e., lack of operational requirements definition and system cost effectiveness not validated against possible alternatives. Review of these major programs by the Defense Systems Acquisition Review Council (DSARC) was minimal. The SH-2D was reviewed, but only after its development and initial deployment. The SH-3H has yet to be subjected to a DSARC review. Fundamental questions are now being raised about both programs which should have been addressed by analysis before the modifications were started. What is its mission? What are the cost-performance-weight trade-offs involved in optimizing the system design?

--At an early point in the Sea Control Ship Program, the Center for Naval Analyses concluded that questions on tradeoffs among competitive systems were fundamental to justifying the system, but were unresolved. The Chief of Naval Operations' Executive Board also recognized that deficiencies existed in the available program information. Decisions were made, however, to fix the size of the ship and the design-to-cost upper limit before the questions and deficiencies were resolved. Although aircraft were to be the principle source of the system's capability, the decisions concerning the size of the ship limited aircraft design considerations. After several years of design and testing, questions on need, justification, and potential alternatives remained unresolved. The program moved into full-scale development and questions about basic issues, i.e., aircraft capabilities, threats, missions and tactics, and integration with other weapon systems remained unresolved. Congress terminated the program in 1974 after 4 years of design, development, test, and modification effort costing at least \$35 million.

OTHER NEEDED IMPROVEMENTS

Compounding the difficulty of making decisions about Navy weapon systems is the lack of information on the capabilities of various alternative systems in a combined force with other weapon systems. Analysis of the complementary nature of different systems interacting with one another is fundamental in dealing with the issues of the need for a system which will become operational a decade from now. Without this information, OSD and the Navy often seem unable to assess the contribution of a particular system to the Navy's total capability. Further, system developers have inadequate guidance on the requirements for a future system and how its design should be integrated with the capabilities of other systems.

Navy officials agreed with this assessment and advised that they were including force mix study results in the requirements formulation process for individual systems. The Navy

also stated that they would be conducting long-range integration studies on a continuing basis to the extent that available resources would allow.

Improvement is needed in the quality of studies being done. Systems analysis can provide insight but may have limitations--particularly with respect to validity of data used, measures of effectiveness, and assumptions made relating to the enemy threat and to the characteristics of conceptual systems. Some studies we reviewed had serious flaws which created an environment of debate over the merits of the study rather than an atmosphere of evaluation for decisionmaking.

The Navy is investigating procedures for establishing standards that would increase the quality and effectiveness of systems analysis studies.

A MASTER PLAN IS NEEDED FOR SYSTEMS ANALYSIS

We recognize that a great deal of information is evaluated in the decision process. For example, before approval is given for full-scale development, a checklist of test and evaluation questions and a master test plan are required. These requirements specify the role of test and evaluation in the review process and fix the responsibility and timing for gathering the information needed.

No such process has been established for systems analysis although such information may often be critically needed. For example, when program initiation is being considered, information is needed to determine that:

- The military requirements properly relate to the mission, to the threat to be countered, and to the overall effectiveness of forces.
- Alternative systems have been considered.
- Mission performance requirements are adequately defined.
- Practical tradeoffs among performance risks, cost and schedule have been considered.

Similar information is also required when a full-scale development decision is being considered.

To formalize the systems analysis process for weapon system acquisition, we believe that a master plan should be developed which would define (for that system) the analyses which must be accomplished, and the time schedule for submission of the results. The kind of master plan we envision for systems analysis would be similar in nature to the Navy's test and evaluation master plan.

The Navy did not concur with the need to establish a master plan for systems analysis. They cited relatively recent Department of Defense Directives as evidence that further emphasis on timing systems analysis to the DSARC process is not needed. The Navy's reply said that these directives include a checklist of issues to be addressed at the DSARC decision points, and that the services' response to these issues, in most cases, is supported by systems analysis.

We solicited the views of Navy and Defense officials responsible for carrying out the systems analysis function and analyzed the Defense Directives referred to in the Navy's reply. We conducted the interviews after the DOD Directives were issued. Officials of the Office of the Assistant Secretary of Defense advised us that they knew of no DOD Directives or instructions specifying when systems analysis should be performed with regard to the DSARC process. A Navy official responsible for systems analysis replied similarly for Navy directives and instructions.

RECOMMENDATIONS

We recommend that you direct the Navy to issue instructions requiring a master plan for systems analysis which would provide timely information at DSARC decision points. Applying such instructions to individual weapon system programs should:

- define the authority, responsibility, and timing for systems analysis to provide information for the decisionmaking process, and

--provide a planning and management tool which, along with the existing testing master plan, would help managers make objective decisions.

We would appreciate being informed of the actions you plan to take in response to our recommendation. We are sending copies of this letter to the Director, Office of Management and Budget; the Chairmen, Senate and House Committees on Appropriations and Armed Services; the Chairman of the House Committee on Government Operations; the Chairman of the Senate Committee on Governmental Affairs; and the Secretary of the Navy.

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 he has taken on GAO recommendations to the House Committee on Government Operations, the Senate Committee on Governmental Affairs, and the House and Senate Committees on Appropriations.

Sincerely yours,



R. W. Gutmann
Director