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program for each Service. It was recommended that OSD develop an affordability analysis procedure for each Service to use in establishing its own 15-year baseline procurement program. Such a procedure was developed, based on the use of an affordability matrix for the procurement appropriations of each Service. It allocates forecasted procurement resources to programs for a 15-year period based on program priority and cost, thereby establishing a 15-year baseline procurement program for each Service.

AFFORDABILITY FOR
MAJOR SYSTEM ACQUISITIONS

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January 1980

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EXECUTIVE SUMMARY

The DoD has an affordability problem in major system acquisition. It cannot reasonably expect procurement appropriations to support its stated plans for the future. Without remedial action it can look forward to uneconomical program execution and delayed deployment of needed systems.

A combination of possible causes gives rise to the affordability problem. More major weapon system programs are started than can be completed as originally contemplated. Costs have been soaring. Forecasting of costs has been poor. Procurement appropriations have steadily been decreasing in real dollars and as a percent of total appropriations. Programming plans more than five years into the future are inconsistently prepared and little used. Vigorous advocates with vested interests make program cancellation or curtailment difficult. An all-too-common consequence is stretchout, causing inefficient production and exacerbating the affordability problem.

Not all of the causes can or should be eliminated. Competition for survival helps evolve superior systems. Program advocacy can play a useful role in assuring good decisions. Procurement appropriations are properly the responsibility of the Congress.

What is needed to relieve the affordability problem is an approach that assures more complete information to resource allocators and program decision-makers and that requires more realism in planning. Such an approach must focus on the roles of the two key actors; the Programming-Planning-Budgeting System (PPBS) participants and the Defense Systems Acquisition Review Council (DSARC).

PPBS participants play the lead role because affordability is a resource allocation issue. It requires simultaneous attention to program priority, resource availability, and estimated cost. Therefore it can be addressed only in the context of all programs competing for the same resources.

The Office of the Secretary of Defense (OSD) should strengthen the PPBS process in two ways:

1. It should clarify and supplement instructions for Extended Planning Annex preparation (a) to assure consistency of interpretation and presentation among the Military Departments and (b) to include as fiscal guidance the procurement appropriation total that each Department should anticipate in each of the fiscal years covered.
2. It should require each Department to present the procurement funding needed for each program in each fiscal year of the 15-year planning horizon, with programs listed in priority sequence and each year's forecasted procurement appropriation cutoff indicated.

The DSARC should play a strong supportive role. In its individual program Milestone Reviews it performs more thorough and detailed analysis than is possible in the PPBS process. It assures that cost estimates are complete and sound and that the program is technically and managerially ready to enter the next phase of development or production. In doing so, the DSARC can help promote realism and credibility in the PPBS. OSD should obtain commitments from the Military Departments to use, in the PPBS process, cost and schedule information which reconciles with that accepted in the DSARC process.

The formal Coordination Draft of Department of Defense Instruction 5000.2 affirms these recommendations by stating that affordability "is principally a determination of the PPBS process" and by requiring that briefings to the DSARC include "comparison of program resource estimates with latest PPBS projections." It goes farther than the recommendations by asking that the presentations to the DSARC (a) rank major systems in a mission area and (b) identify potential offsets when program cost estimates exceed budget projections. Such ranking of systems and identification of offsets cannot effectively be dealt with by a body that examines one program at a time, generally

conducts less than twenty reviews per year, and does not evaluate all programs. The language on ranking and offsets should be deleted from the Instruction.

Affordability is a serious problem, but it can effectively be addressed through PPBS and DSARC processes without elaborate change to either. Clearer and more comprehensive layout of program priorities, cost projections, and resource availabilities in the PPBS and firm support from the DSARC can contribute to its solution.

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1. INTRODUCTION

THE AFFORDABILITY PROBLEM

DoD financial planning guidance prescribes only a 2.7 percent real growth rate per year for future appropriations, but more systems are being developed and produced than the anticipated budgets will accommodate.¹ A recent GAO report indicated that it would require approximately \$72.5 billion annually for the next 10 years just to complete procurement of the DoD systems currently in development or production.² Fiscal year 1979 military procurement appropriations totalled approximately \$31 billion. It is clear that the DoD realistically cannot afford to complete some programs already in existence.

In the past, the DoD has emphasized improvements in estimating program costs and in keeping those costs within the estimates. Insufficient effort has been devoted to deciding in advance the amount the DoD can afford to spend to satisfy mission needs within each mission area, prioritizing the individual mission elements, and then establishing an affordable plan for satisfying those needs.

A traditional solution to the problem of more requirements than resources has been to stretch out programs by deferring some of the funding. This has enabled most ongoing programs to continue. Such deferrals, however, have produced undesirable consequences, including:

- inefficient and uneconomical rates of production
- large program cost increases
- equipment inventory shortages
- long acquisition cycles

¹ Assistant Secretary of Defense, (Program Analysis & Evaluation) Memorandum: Extended Planning Annex (EPA) Guidance, 16 April 1979.

² "Impediments To Reducing The Costs of Weapon Systems," PSAD-80-6, 8 November 1979.

- delays in fielding new equipment
- adverse DoD relationships with Congress, industry and the public

In addition, program funding deferrals have created a growing backlog of ongoing programs in need of procurement funds in order to be completed. This backlog sometimes is called the "acquisition bow wave."

The situation just described is known as the affordability problem. Affordability has been defined as "the ability to provide adequate resources to acquire and operate a system."³ At present, DoD does not have a definitive plan for addressing the problem. Questions of affordability are now raised in the Defense Systems Acquisition Review Council (DSARC) and Planning, Programming, and Budgeting System (PPBS) processes. Affordability is also a topic of increasing Congressional interest.

THE NEED FOR CONSIDERATION OF AFFORDABILITY

The need for consideration of affordability in major system acquisition was recognized by the Defense Science Board (DSB) in its Report of the Acquisition Cycle - Task Force, March 15, 1978. It concluded that "the basic reason for the lengthening of the production phase is that there are simply more programs ready to enter the production phase at any given time than there are production funds available to fund them." The DSB recommended that the DoD "fund fully only that number of the most critically needed programs so that the resources required will be within the Congressional budget limitations." Those "affordable" programs would be the only ones for which the Mission Element Need Statement (MENS) would be approved at Milestone O.

A preliminary concept for addressing affordability has been drafted by the Office of the Under Secretary of Defense, Research and Engineering (OUSDRE). Included in that concept are such issues as program priority within a mission area and the influence of short and long-term budgetary constraints on program decisions.

³ Formal Coordination Draft of DoD Instruction 5000.2, 17 October 1979.

The primary objective of the study underlying this report was to develop a management approach for addressing the affordability problem in procurement funding, giving due consideration to current OSD initiatives. A second objective was to quantify the magnitude of the affordability problem in the procurement area using data on actual DoD programs. As the DSB made clear in its Report quoted above, the procurement funding area is where the affordability problem is most acute. It is recognized that consideration of affordability should embrace all funding categories (research and development, procurement, operation and support); nevertheless, a method for addressing affordability in procurement funding alone should be a significant contribution to solving the affordability problem.

2. FINDINGS

THE MAGNITUDE OF THE AFFORDABILITY PROBLEM

To quantify the magnitude of the affordability problem in the procurement area, requirements (i.e., forecasted program procurement costs) were compared with resources (i.e., forecasted procurement appropriations) for the Army, Navy and Air Force. The requirements data were extracted from each Military Department's Extended Planning Annex (EPA) to its fiscal 1980 Program Objective Memorandum (POM). Resource data were developed by applying assumed annual real growth rates of 1, 2 and 3 percent to actual procurement appropriations for fiscal 1979. Those growth rates were chosen in light of current fiscal guidance, the historical lack of significant real growth in procurement funds, and the increasing share of total funds needed for operation and support at the expense of procurement. Due to the classified nature of certain data, detailed findings are not presented in this report. General findings are discussed below.

Both the Army and the Navy have a large potential affordability problem in the procurement area throughout the entire fiscal 1980 to 1994 period, irrespective of the assumed annual real growth rate used to forecast "outyear" procurement appropriations. ("Potential affordability problem" means that estimated program procurement costs exceed forecasted procurement appropriations.) The Air Force, on the other hand, does not have a potential affordability problem except for the period fiscal 1990 through 1994, assuming 2 percent annual real growth in procurement appropriations, and except for the period fiscal 1986 through 1994, assuming 1 percent annual real growth in procurement appropriations. The potential affordability problems for the Army and Navy are so large that shifting any potential Air Force excess appropriations would do little to ease them. Therefore, DoD as a whole is faced with a large and ever-increasing potential affordability problem.

Although the procurement cost estimates used in this analysis do not take into account such factors as potential cost growth or program cost estimating inaccuracies, such factors have been and continue to be a reality. It is likely that the programs included in this analysis will experience cost growth, exacerbating the affordability problem. Clearly, there is a great disparity between requirements and resources in the DoD, and more systems are being developed and produced than anticipated future budgets will support.

FACTORS CONTRIBUTING TO THE AFFORDABILITY PROBLEM

Five major factors contribute to DoD's affordability problem: insufficient interaction between the PPBS and the DSARC, program cost growth, limited period covered by the PPBS, program advocacy, and the downward trend in procurement appropriations.

Insufficient Interaction Between The PPBS and The DSARC

For the most part, the DSARC and PPBS processes operate independently. Existing OSD and Service regulations and instructions do not require any specific interaction between these two processes and, at present, there is very little. PPBS decisions are often made without due regard to their programmatic consequences. The budgeting process focuses on the programs to be funded in the first years of the Five Year Defense Plan (FYDP). There are generally more programs needing funds than there are funds available in any given year. Hence, programs must be cut or altered. This can result in decisions which may appear logical from a budgeting standpoint (e.g., stretching out several programs to stay within immediate year budget constraints) but questionable from a program management standpoint.

Similarly, DSARC decisions are often made without due regard to fiscal constraints. A DSARC review focuses on a particular program and tries to determine the best method for carrying it out from a technical and business perspective. The DSARC pays little attention to the other programs competing for available funds. Therefore, decisions sometimes cannot be fully implemented because of funding limitations.

OSD has addressed the problem of DSARC/PPBS linkage through an affordability policy statement included in the latest draft revision to DoD Instruction 5000.2, "Major System Acquisition Procedures." (That policy statement is shown in its entirety in the appendix.) This instruction now requires that program milestone presentations to the DSARC include:

- "comparison of program resource estimates with latest PPBS projections (including the extended planning annex)"
- "identification of the relative ranking for this and the DoD Component's other major systems in the mission area in the latest program or budget submission"
- "where program cost estimates exceed latest budget projections, identification of potential offsets necessary to provide the resources to execute the remaining phase(s) of the program in the manner recommended to the DSARC"

The policy statement specifies that affordability is principally a determination of the PPBS process, even though the policy impetus comes from those responsible for the acquisition process, not the PPBS process. The absence of such a policy statement from those responsible for the PPBS process may be due to the prevailing view that affordability considerations are inherent in the fiscal constraints and program prioritization used in the PPBS process.

The SecDef Consolidated Guidance to the Military Departments for POM preparation includes limits (called fiscal guidance) on available outyear funding. Program prioritization results from OSD requiring the Services to submit their POMs using three different levels of assumed funding availability, called the minimum, basic and enhanced cases. (The minimum case is the lowest level of assumed funding, and the enhanced case is the highest.) The programs appearing in the minimum case represent the Department's best judgment as to which programs should continue even if overall DoD funding is reduced. Hence, they have a higher priority than the programs only in the basic case, which in turn have a higher priority than those only in the enhanced case. Programs in the basic and enhanced cases are further prioritized during the PPBS process. In practice,

programs comprising existing forces tend to be placed in the minimum case. Since operating and support funds are required for such programs, the programs needing procurement funds tend to appear in the basic and enhanced cases. Hence, the procurement programs receive the most discriminating priority ranking.

Program Cost Growth

There have been many major cost increases in DoD system acquisitions. A recent GAO report stated that of the \$235 billion in estimated costs for 58 current DoD major acquisitions, \$95 billion represents cost growth over the baseline (development) estimates.¹ The Report of the Commission on Government Procurement stated:

Entire system costs cannot be estimated realistically during its early development. Institutional arrangements and advocacy pressures tend to drive cost estimates downward and to produce overly optimistic schedule and performance appraisals. All levels in a department, in industry, and even in Congress can become parties to the "selling" of programs founded on unrealistic and unattainable system cost goals.

Overly optimistic cost estimates used to "sell" a program tend to become the basis for budgeting it. When it becomes obvious that the estimates are low, the program may be stretched out to stay within overall budget constraints, thereby adding to the acquisition bow wave and aggravating the affordability problem.

Limited Period Covered By the PPBS

The primary PPBS document (the FYDP) spans only 5 years, but the acquisition cycle for major weapon systems can extend to 10 or 15 years. The PPBS may not include in the procurement accounts some high priority programs still in the development stage which will not need procurement funds until beyond the FYDP timeframe. When such programs reach the point where procurement funds are needed, ongoing programs may be stretched out to accommodate them.

¹"Review of the Department of Defense's Implementation of Procurement Reforms," PSAD-79-106, 25 September 1979.

²Report of the Commission on Government Procurement, Volume 2, December 1972, Part C--Acquisition of Major Systems.

In theory, the Military Department EPAs should take over where the FYDP leaves off and be the basis for consideration of procurement programs over the 10 years subsequent to the FYDP. EPAs are apparently little used. There is little uniformity in the way they are prepared -- perhaps largely to the lack of OSD guidance or requirements in this matter.

Program Advocacy

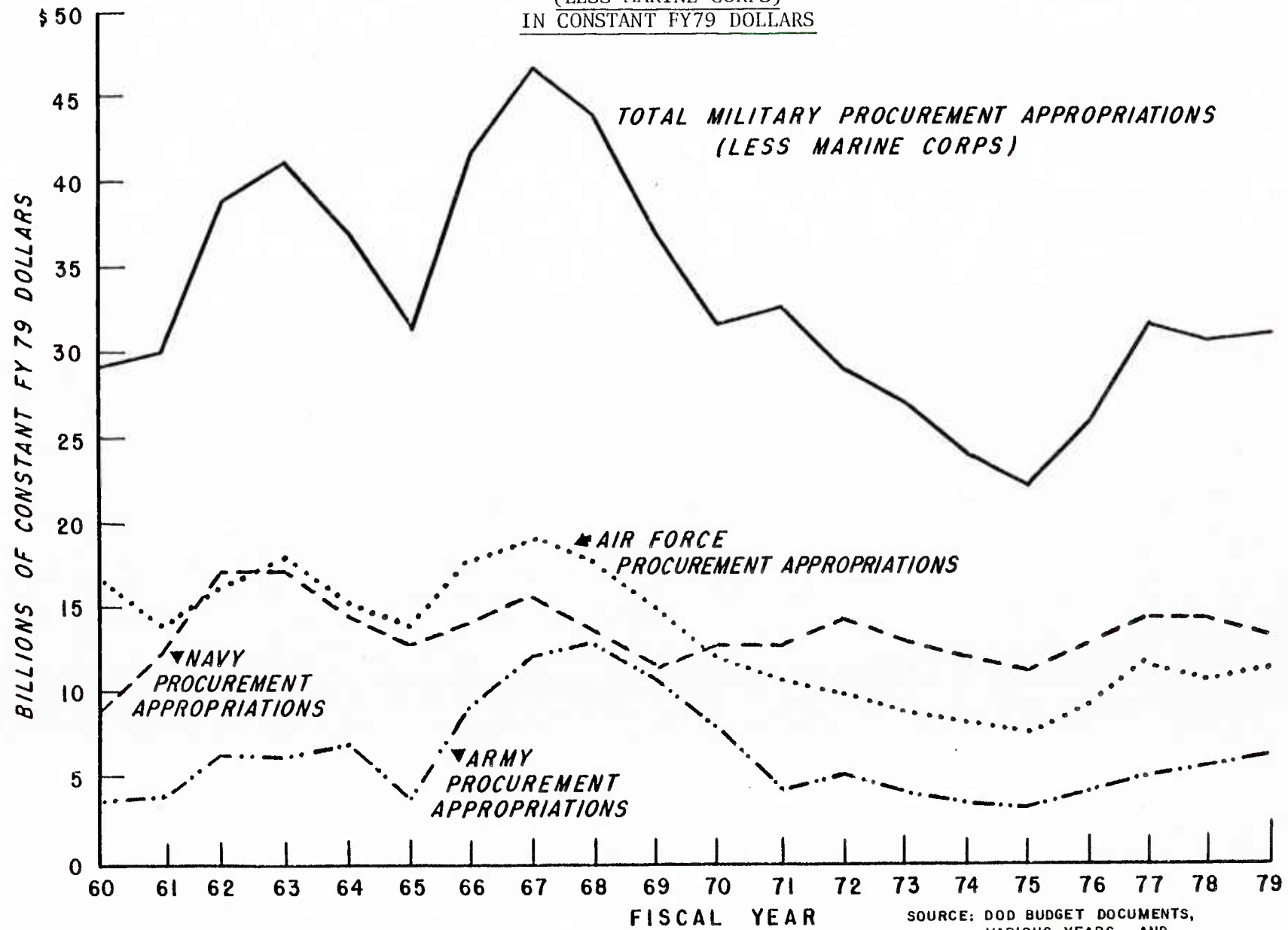
It is difficult to cancel a program once it gains momentum and advocacy within a Service, OSD or the Congress. This problem increases once a program gets into full-scale development and approaches a production decision. The DSB in its 1977 Summer Study on the acquisition cycle found that, "...with strong advocates, certain programs may be continued in existence long after they should have been terminated for technical problems, inadequate capability, cost or schedule overruns, or similar reasons." To the extent that marginal programs are continued only because of strong advocacy, the affordability problem is intensified.

Downward Trend in Procurement Appropriations

For the past 20 years, the trend in military procurement appropriations, in constant dollar terms, has been downward (see Figure 2-1). The trend in the ratio of procurement appropriations to total appropriations has also been downward for the same period (see Figure 2-2). This history indicates that, despite current initiatives to increase defense spending by an average of 4.5 percent in real terms over the next five years, significant real growth in procurement appropriations is unlikely. Hence, DoD must plan on the basis of a relatively slight growth in outyear procurement resources. Despite this, the Military Departments are not given outyear fiscal constraints on procurement appropriations for use in planning outyear programs. The only constraints are on total appropriations. Thus, a Department can plan for a large real growth in procurement resources in any year, as long as the total of all needed resources stays within the fiscal guidance given it. This contributes to DoD's affordability problem.

FIGURE 2-1

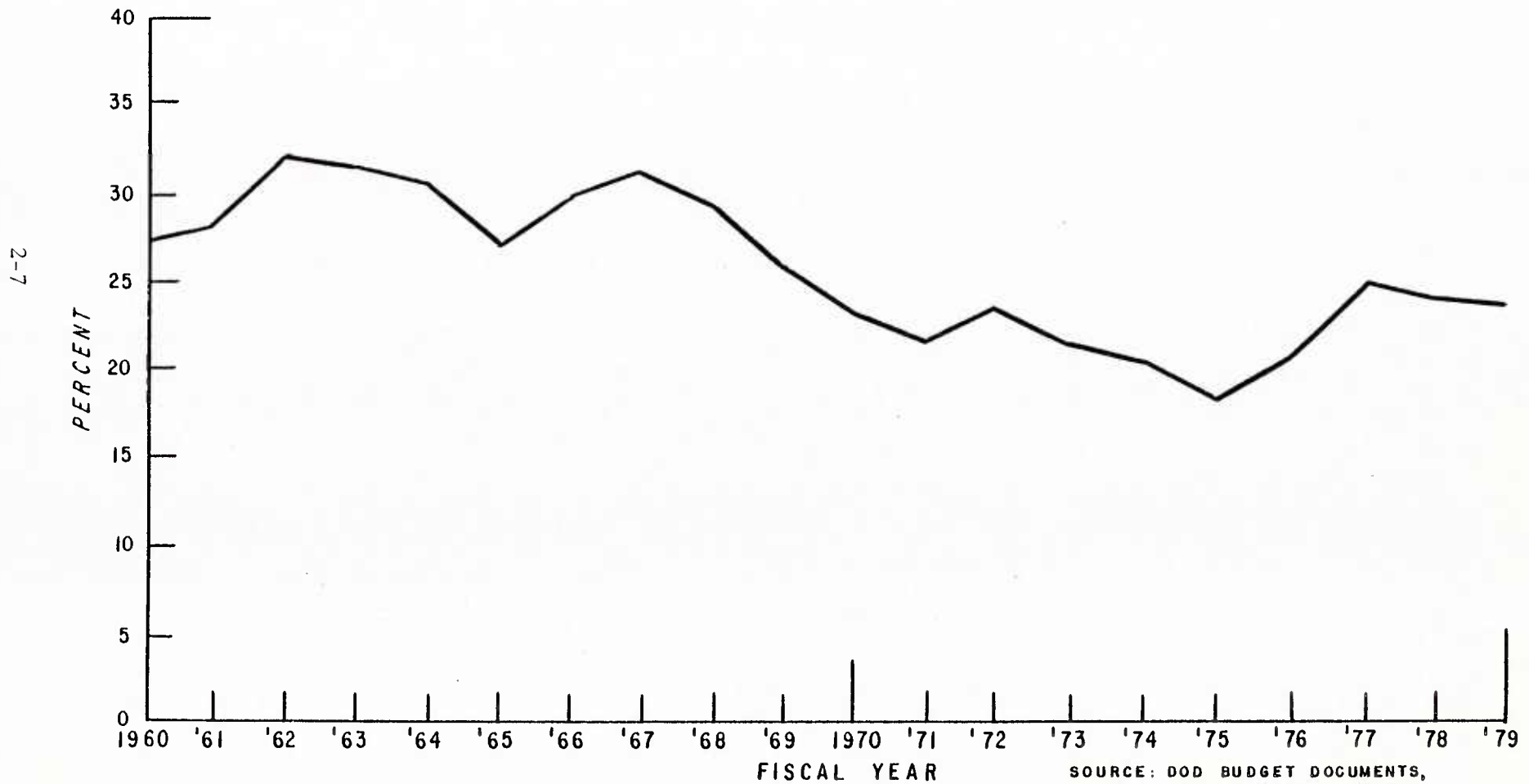
ACTUAL MILITARY PROCUREMENT APPROPRIATIONS
(LESS MARINE CORPS)
IN CONSTANT FY79 DOLLARS



SOURCE: DOD BUDGET DOCUMENTS,
VARIOUS YEARS; AND
LMI ANALYSIS

FIGURE 2-2

TOTAL MILITARY PROCUREMENT APPROPRIATIONS
AS A PERCENT OF
TOTAL DoD MILITARY APPROPRIATIONS



SOURCE: DOD BUDGET DOCUMENTS,
 VARIOUS YEARS; AND
 LMI ANALYSIS

3. CONCLUSIONS

A FRAMEWORK FOR AFFORDABILITY ANALYSIS

Affordability deals principally with the question of how to allocate resources to competing programs. Therefore, affordability determinations must be a responsibility of the PPBS resource allocation process. Affordability cannot be addressed on an individual program basis alone. It must be addressed in terms of all programs competing for the same resources. This is another reason why the PPBS, which considers all resource demands in unison, must be the forum for determining affordability.

Three basic factors determine affordability: program priority, availability of budget resources, and program cost. Affordability analysis must deal simultaneously with all three factors, and try to reconcile available resources with needs. A discussion of the three factors follows:

Priority - Foremost among the factors determining affordability is the relative priority of the programs competing for the same resources. In an environment where there are more requirements (programs) than resources (funding), the requirements must somehow be ranked according to importance so that the limited resources may be properly allocated. Certain DoD programs are absolutely essential because of the urgency and severity of the threat against which they are to be deployed. Their high priority makes them affordable. For such programs, such considerations as operating and support requirements (including manpower) have little bearing on whether or not the program should be pursued. The question relative to the other considerations is how best to minimize their costs without degrading ability to carry out the intended mission. Operating and support considerations may, however, be critical in deciding on the affordability of less essential systems of equal priority if there are insufficient resources to accommodate all of them.

Availability of Budget Resources - Clearly, all systems would be affordable if the available resources were unlimited. Since this is not the case, knowing the amount of resources available is crucial in determining what programs are affordable. Consequently, ability to forecast outyear budget resources is essential to addressing affordability.

Program Cost - The resources needed to accomplish a program are determined on the basis of program cost estimates. Because of the importance of program cost in the determination of affordability, it is imperative that program cost estimating in the Services and OSD be realistic.

Putting the above factors together, an affordable program is one with a high enough priority so that when its estimated costs are added to the estimated costs of all programs with a higher priority, the resulting sum is less than or equal to the forecasted resources available.

Program priorities should be based on assessment of the need and military essentiality for each program competing for the same resources. They should be consistent with national objectives and policy as represented in promulgations of the National Security Council and the Joint Chiefs of Staff. Current OSD initiatives in the area of NATO rationalization, standardization and interoperability could affect program priorities.

With respect to availability of budget resources, OSD and the Military Departments should take into account the downward trend in procurement appropriations as a percentage of total appropriations when planning for outyears. They should recognize that since outyear planning and programming is based on constrained real growth in the total of all appropriations, experience indicates it is logical to limit the real growth in the procurement appropriations for outyear planning and programming purposes. Also, forecasts of outyear procurement resources should be made in a uniform and consistent manner by all the Departments, and the results should appear logical and realistic in light of past experience.

THE DSARC ROLE IN AFFORDABILITY

The DSARC was established "to advise (DepSecDef) of the status and readiness of each major system to proceed to the next phase of effort in its life cycle."¹ No role in the resource allocation process was contemplated for the DSARC.

The Defense Resource Management Study Final Report by Donald B. Rice, dated February 1979, also addresses the role of the DSARC and its involvement in resource allocation. Specifically, this report states:

- "DSARC was created to 'discipline the acquisition process' by directing top management attention to the critical decision points of important acquisition projects."
- DSARC "was not designed as a parallel resource allocation process; rather, it was to provide for a structured technical and financial management review of a project and 'authorization' for it to proceed, while the PPBS continued to serve the internal 'appropriation' function."
- "The alternative selected by the DSARC (should not) drive the funding profile approved in the programming process."
- "The internal 'appropriation' function - the decision to proceed with a program - should consider its 'affordability' over time in the context of aggregate projections of Defense funding requirements. DSARC decisions should remain permissive authorizations: Proceed if you have, or if you can obtain, the resources needed to continue the project."

We concur with the general thrust of the above comments on the DSARC's role in resource allocation. Further, we note that the DSARC examines relatively few programs each year. For example, in FY79 only 13 programs underwent a DSARC milestone review, and for the past 10 years the DSARC has been averaging only 18 to 20 program milestone reviews per year. Moreover, many systems are never reviewed by the DSARC, and the time between DSARC reviews for some programs can exceed five years.

We conclude that DSARC's role in affordability determinations should be to support the PPBS by continuing to ensure that the decisions made in the PPBS arena on what is to be acquired are carried out in a sound business and technical manner. The DSARC, with

¹DepSecDef Memorandum, "Establishment of a Defense Systems Acquisition Review Council," 30 May 1969.

its more detailed examinations of a program, also can be supportive of the PPBS by verifying a program's progress at critical points in its life, and by validating program cost estimates which can be used in the PPBS process. Relative to affordability, this role falls short of that contemplated in the latest draft revision to DoD Instruction 5000.2. It is not proper for the DSARC, which reviews programs one at a time, to be involved in the ranking of programs within mission areas. Further, the DSARC should not be involved in identifying potential offsets that may be necessary to provide resources to execute the program.

OTHER CONCLUSIONS

The acquisition bow wave and other problems which necessitate consideration of affordability-related issues could be eased in three ways: increasing the amount of available procurement resources in the outyears; reducing the cost of programs in development and production; and cancelling some lower priority programs. However, as previously indicated, it is unlikely that a significant increase in future DoD procurement appropriations will occur. Thus, actions in this area do not appear to hold much promise relative to easing the affordability problem. Cost reduction efforts in DoD have been numerous and should be continued. However, to date they have not had enough effect on the affordability problem. To come to grips with the affordability problem, a 15-year baseline procurement program should be established for each Military Department. Existing procurement programs should be re-evaluated in light of the baseline procurement program. Such an effort may lead to cancellation of some lower priority programs. This concept is discussed further in Chapter 4.

4. RECOMMENDATIONS

PRINCIPAL RECOMMENDATIONS

OSD should strengthen its guidance to the Military Departments for preparation of the Extended Planning Annexes (EPAs). Specifically, actions should be taken to ensure that each Department's EPA is prepared and presented consistently. More importantly, specific fiscal guidance for the total of each Department's procurement appropriations in each of the EPA years, as well as each of the POM years, should be included in the preparation instructions issued by OSD.

The DSARC should adopt a role in affordability determinations which is supportive of the PPBS, as discussed in the previous chapter. In addition, we recommend that the DSARC ensure that any analytical methods presented at Milestone Reviews (e.g., unit cost vs. production rate) which could be used to generate information on the cost consequences of a change to the structure of a program (e.g., quantity reduction or stretch-out) are appropriate. Such information may be useful in PPBS deliberations.

The affordability policy statement in the Formal Coordination Draft of DoD Instruction 5000.2 should be changed. The requirement for the Services to identify potential offsets in those cases where estimated program costs exceed the latest budget projections should be eliminated because this is properly a PPBS function, not a DSARC function. The requirement for identification of the ranking in mission areas of programs subject to DSARC review should also be eliminated for the same reasons.

OSD Should develop an affordability analysis procedure for each Military Department to use in establishing its own 15-year baseline procurement program. This procedure should be used in conjunction with the PPBS deliberations and should provide a mechanism which:

- displays the three factors determining affordability (program priority, resource availability and program cost) and shows their relationships

- helps reconcile requirements and resources in the procurement accounts
- identifies the consequences of changes in the baseline procurement program
- permits early identification of potentially unaffordable or marginally affordable programs
- allows early identification of "planning wedges" (i.e., outyear resources reserved for specific programs) which can be used during DSARC deliberations as a constraint on program acquisition strategy

In addition, this procedure should display the various demands on procurement resources over a 15-year period.

AN AFFORDABILITY ANALYSIS PROCEDURE

A procedure for affordability analysis in the procurement funding area has been developed by LMI. This procedure encompasses all the principles outlined above and is based on the use of an affordability matrix for the procurement appropriations. Each Military Department would develop its own matrix. Figure 4-1 is a hypothetical example of an affordability matrix.

Description of the Affordability Matrix

The matrix lists all programs in a Military Department (including non-DSARC programs) that will require procurement funding in any of the next 15 fiscal years. The programs are listed in order of priority. Priority is based on a military assessment of the need and essentiality for the program determined in a manner consistent with applicable JCS and NSC promulgations, national objectives, etc. In light of our recommendation that each Military Department should be given specific fiscal guidance for the procurement appropriations, it does not appear necessary to consolidate the individual Department lists into one prioritized DoD list.

For each program the latest and best estimate of the procurement funds needed in each of the 15 fiscal years is indicated. These estimates should be consistent or capable of reconciliation with those used at the most recent DSARC review for the program to ensure that the most reliable information is being used in both the DSARC and

FIGURE 4-1. HYPOTHETICAL EXAMPLE OF LMI AFFORDABILITY MATRIX FOR A MILITARY DEPARTMENT
(In Millions of FY 1980 Dollars)

ESTIMATE OF REQUIRED PROCUREMENT FUNDS BY YEAR
(range of estimates shown for FY83 through FY95)

PROCUREMENT PROGRAMS, BY PRIORITY	ESTIMATE OF REQUIRED PROCUREMENT FUNDS BY YEAR (range of estimates shown for FY83 through FY95)														
	FY81	FY82	FY83	FY84	FY85	FY86	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95
1	2,000	2,000	1,500 - 1,650	800 - 1,000											
2			500 - 600	600 - 750	1,000 - 1,200	700 - 900	500 - 600	400 - 475	400 - 475						
3	1,500	1,700	2,000 - 2,200	2,000 - 2,300	1,500 - 1,700	1,000 - 1,200									
4	500	600	600 - 650	500 - 600	900 - 1,100										
5						1,050 - 1,275	1,200 - 1,400	1,125 - 1,500	1,200 - 1,425	1,150 - 1,500	1,100 - 1,500	800 - 1,200			
6										750 - 1,100	1,000 - 1,400	1,500 - 2,000	1,500 - 2,100	1,000 - 1,400	800 - 1,100
7										200 - 300	500 - 700	1,000 - 1,300	1,200 - 1,600	1,000 - 1,400	750 - 900
8	1,100	750	600 - 700	500 - 600	1,600 - 1,850	1,400 - 1,700									
9	25	50	50 - 60	20 - 25	15 - 25										
10	800	600	400 - 450												
11											1,800 - 2,200	2,600 - 3,000	2,000 - 2,800	1,400 - 1,800	1,500 - 2,000
12						1,500 - 1,850	2,000 - 2,500	1,600 - 1,900	1,200 - 1,450						
13		400	450 - 500	450 - 520	500 - 600	500 - 650	400 - 475	350 - 400	250 - 300	250 - 300					
14	1,750	1,800	800 - 875	700 - 800	750 - 875	800 - 950									
15									1,000 - 1,200	1,250 - 1,550	1,500 - 1,900	1,750 - 2,250	1,500 - 2,100	1,200 - 1,500	800 - 1,000
16	150	200	200 - 220	150 - 175	200 - 250	150 - 175	100 - 130	100 - 135	75 - 100						
17								650 - 750	1,000 - 1,200	1,500 - 1,900	1,500 - 1,900	1,000 - 1,300	800 - 1,000	800 - 1,100	500 - 750
18	1,500	750	800 - 900	500 - 600											
19							750 - 850	900 - 1,100	900 - 1,150	1,000 - 1,350	1,200 - 1,500	900 - 1,100	900 - 1,150	750 - 900	
20	1,800	1,800	1,900 - 2,000	2,100 - 2,400	1,800 - 2,100	1,100 - 1,300	1,000 - 1,250								
21							2,000 - 2,500	2,300 - 2,900	3,000 - 3,500	3,500 - 4,100	2,500 - 3,000	2,200 - 2,550	1,500 - 2,000	1,100 - 1,400	900 - 1,250
22	500	750	800 - 875	750 - 850	500 - 600										
23	1,000	1,200	1,200 - 1,300	1,500 - 1,750	1,400 - 1,650	1,350 - 1,600	1,100 - 1,350	500 - 700							
24										2,500 - 3,000	2,750 - 3,100	3,200 - 4,200	3,500 - 4,500	4,000 - 5,200	
25	1,500	1,900	2,000 - 2,200	1,800 - 2,100	1,900 - 2,200	1,700 - 2,000	1,200 - 1,500	800 - 1,000							
26							850 - 1,000	1,100 - 1,400	1,500 - 1,750	2,000 - 2,500	1,500 - 1,900				
27	500	750	950 - 1,050	1,200 - 1,350	1,500 - 1,800	1,500 - 1,850	1,000 - 1,250								
28								1,500 - 1,800	2,000 - 2,400	2,500 - 3,000	1,800 - 2,300	1,500 - 2,100	1,200 - 1,700	1,000 - 1,300	1,100 - 1,400
29		800	1,000 - 1,100	1,200 - 1,350	1,900 - 2,200	1,200 - 1,400	800 - 950								
30												2,500 - 3,000	3,500 - 4,500	3,900 - 5,000	5,000 - 6,500
TOTAL	14,625	16,050	15,750 - 17,330	14,770 - 17,170	15,465 - 18,150	13,950 - 16,850	12,150 - 13,405	11,175 - 14,810	12,525 - 14,900	14,000 - 17,400	16,700 - 21,150	18,800 - 23,300	17,300 - 24,100	15,800 - 20,550	16,100 - 21,000
ESTIMATE OF AVAILABLE PROCUREMENT APPROPRIATIONS	9,180	9,363	9,550	9,741	9,936	10,135	10,338	10,544	10,755	10,970	11,190	11,414	11,642	11,875	12,112

PPBS processes. The quantity of each system to be procured in any given year (and hence the estimate of required procurement funds) should be based on the military assessment of the numbers required within a specific time frame to counter the threat against which the system is to be deployed. These program estimates should be expressed in constant dollars, so as to eliminate the problem of forecasting outyear inflation rates. It is important that the estimates of procurement funds requirements be as accurate as possible. However, the difficulty in estimating outyear program costs is recognized. Therefore, in the hypothetical affordability matrix, the outyear estimates of required procurement funds for a given program are shown as a range.

Shown beneath the listing of programs in the affordability matrix is an estimate of available procurement funds for each of the 15 fiscal years indicated (1981 through 1995). For this illustration, we forecasted outyear procurement appropriations by applying a 2 percent per year real growth rate to assumed fiscal 1980 procurement appropriations of \$9 billion. The Military Department forecasts of outyear resources should be consistent with OSD fiscal guidance.

Once the matrix is created, an affordability line can be established for each fiscal year. Affordability lines are shown as dashed lines in Figure 4-1. The sum of the estimated procurement funds needed for all programs above this affordability line should be less than or equal to the forecasted available procurement appropriations for that year. In the outyears there may be two affordability lines because there is a range of estimates for programs in those years. A program above the line is affordable because it and all programs with a higher priority can be accommodated within the forecasted available resources.

Use of the Affordability Matrix

The affordability matrices should be used in the PPBS process to establish a baseline long-range procurement program. They should be updated annually, at a minimum, and submitted with the Military Department POMs. The matrices would permit

the Defense Resources Board (SecDef's principal advisory body in the PPBS process) to examine the probable outyear consequences of budget decision alternatives such as program stretch-out, deferral, or cancellation. They would also permit identification of the marginal programs which need more thorough examination relative to affordability.

Affordability matrices could be used to allocate planning wedges to upcoming and existing procurement programs. This type of information could then be used by the DSARC as a constraint in determining how a program should be conducted. Allocation of planning wedges may also lead to stable funding for high priority programs.

Affordability matrices may also provide some insight into which areas should not be pursued in the Research, Development, Test and Evaluation (RDT&E) appropriations. For example, a program which the matrix identifies as clearly unaffordable from a procurement standpoint should be thoroughly scrutinized prior to a decision to transition from technology base effort (budget categories 6.1 and 6.2) into exploratory development (budget category 6.3).

The affordability matrix is flexible enough to permit easy demonstration of the impact of changes on the baseline long-range procurement program. For example, different matrices could be developed to show the effect on a Department's affordable procurement program of changes in:

- the forecast of outyear appropriation availability
- the relative priority of different programs
- the planned production quantities or procurement schedule or production rate for a particular program, using information and analysis from the DSARC process.

In addition, the matrix would be able to show the impact of new requirements on the baseline procurement program. The matrix could be automated so that the effect of changes in one or more of the variables could be readily examined.

As previously indicated, the program information used in both the DSARC and PPBS processes should be consistent or capable of reconciliation. Therefore, the

responsibility for monitoring the affordability matrix should rest with the OUSDRE action officers who already monitor programs from both an acquisition management (DSARC) and resource allocation (PPBS) perspective. When the affordability matrices are submitted with the POMs, the OUSDRE action officers could verify for their individual programs the accuracy of the estimates of required procurement funds to ensure consistency with the figures used at the DSARC. They could also check the priority of their programs to ensure that there are no gross deviations from applicable JCS or NSC promulgations. Any discrepancies noted by the OUSDRE action officers could be raised as issues to be resolved by the DRB during its PPBS deliberations.

In summary, affordability is a resource allocation problem. Therefore, the PPBS process should have the preeminent role in affordability determinations and the DSARC should have a supportive role. Finally, an affordability analysis procedure for procurement funding, using tools such as the affordability matrix, should be a significant contribution to solution of the affordability problem.

APPENDIX

AFFORDABILITY POLICY STATEMENT

OUSDRE has included the following affordability policy statement in the Formal Coordination Draft of DOD Instruction 5000.2, dated 17 October 1979:

(1) Affordability, the ability to provide adequate resources to acquire and operate a system, is principally a determination of the PPBS process. The ability to provide sufficient resources to execute a program in an efficient and effective manner is a fundamental consideration during milestone reviews. Authorization to proceed into the next acquisition phase must be accompanied by assurance that sufficient resources are or can be programmed to execute the program as directed by the Secretary of Defense.

(2) The DoD Component will describe in the MENS the general magnitude of resources it is prepared to commit to acquire a system to satisfy the need. At Milestone I, affordability considerations will be used as a factor in determining the selection of alternative concepts. At Milestones II and III, a favorable decision will not be made unless the system's projected life cycle costs, including product improvement and other modifications, are within the amounts reflected in the latest Five Year Defense Plan/Extended Planning Annex (FYDP/EPA), or unless compensating changes are made to other item(s) in the defense program.

(3) The DoD Component briefing presented to the DSARC at Milestones I, II, and III shall include the following affordability considerations:

(a) Comparison of program resource estimates with latest PPBS projections (including the extended planning annex).

(b) Identification of the relative ranking for this and the DoD Component's other major systems in the mission area in the latest program or budget submission.

(c) Analysis of variation in unit cost with production rate (Milestones II and III).

(d) Where program cost estimates exceed latest budget projections, identification of potential offsets necessary to provide the resources to execute the remaining phase(s) of the program in the manner recommended to the DSARC.