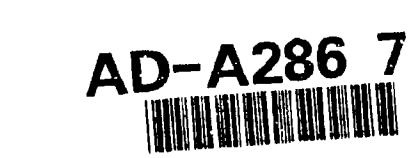
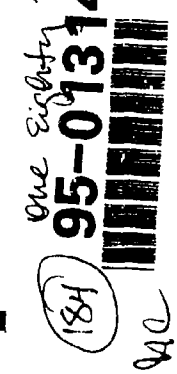


RAND

The Decisionmaking Context in the U.S. Department of the Navy

A Primer for Cost Analysts

Eric V. Larson, Adele R. Palmer



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The Decisionmaking Context in the U.S. Department of the Navy

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Eric V. Larson, Adele R. Palmer

Prepared for the
Director, Program Analysis and Evaluation

National Defense Research Institute

PREFACE

This report presents partial findings from the DoD Cost Factor Study that has been part of the Force Structure and Support Infrastructure Costing Project. This project is being conducted for the Director, Program Analysis & Evaluation, and is being performed in the Defense Manpower Research Center, a component of RAND's National Defense Research Institute, a federally funded research and development center supported by the Office of the Secretary of Defense and the Joint Staff.

This report was written for cost analysts and others desiring a broad introduction to the organization of the U.S. Department of the Navy (DON) and its decisionmaking context for major allocations (e.g., regarding elements of force structure, and research, development, and acquisition of systems), especially its Programming, Planning, and Budgeting System (PPBS) and Research, Development, and Acquisition (RDA) processes. The report focuses on the terminology, organizational structures, and decision processes that are important to cost analysts.

Most of the basic research was completed in 1991–1992, although some information has been included to bring selected portions of the document up-to-date. Nevertheless, the DON has continued to change, and specific organizations, documents, fora, and processes documented in this report may also have changed. The reader is urged to become acquainted with any subsequent changes by referring to the relevant documentation.

Previously published reports in this series are

- Adele R. Palmer, *Cost Factors in the Army: Volume 1—The Decisionmaking Context*, Santa Monica, Calif.: RAND, R-4078/1-PA&E, 1992.
- Adele R. Palmer and Eric V. Larson, *Cost Factors in the Army: Volume 2—Factors, Methods, and Models*, Santa Monica, Calif.: RAND, R-4078/2-PA&E, 1992.

Taken together, the entire set of reports should provide useful background information for defense cost analysts inside and outside the Department of Defense.

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SUMMARY

The purpose of this report is to highlight enduring features of the U.S. Department of the Navy (DON) that are important to cost analysts. The report describes the decisionmaking context for costing decisions in the DON—organizations' structure, terminology, decision processes, and key issues—that relate to the development, use, and reporting of cost analyses. It emphasizes four top-level themes that are important to cost analysts in understanding DON costing procedures and information: (1) the complexities of coordination; (2) the interrelations of DON Planning, Programming, and Budgeting System (PPBS) and Research, Development, and Acquisition (RDA); (3) variation in the data, models, and other tools that are used to support costing in the DON; and (4) the uncertainties resulting from the changes in the DON's operational and budgetary environments.

DON military capability results from a complex, coordinated application of air, sea, and ground elements. The application involves two naval services—the Navy and the Marine Corps—and a task-oriented building-block approach to operations that tailors force elements (building blocks) to the specific requirements of a given operation. The organizational structure and decisionmaking processes of the DON reflect the demands of planning in this complex environment.

To develop its capabilities, the DON relies on two major allocative processes—its Planning, Programming, and Budgeting System process, and its Research, Development, and Acquisition process. These two processes are conducted to facilitate coordination through broad participation and reliance on expert judgment. It is critical for the cost analyst to understand the DON's PPBS and RDA processes be-

cause they are the means by which major allocative decisions are made in the DON and the domain of the great bulk of costing information and expertise.

In support of the PPBS and RDA processes, the DON uses a wide variety of data, models, and other tools that use or generate costing information. The cost analyst must remain alert to the appropriateness of those tools for service-specific (i.e., Navy or Marine Corps), DON-wide, or joint and/or interservice cost analyses. Given the many levels of analysis, differing assumptions about what costs are included or excluded, and other vagaries, the cost analyst should be careful in using costing information.

All aspects of the DON, including organization, strategy, requirements, force structure, and doctrine, have been affected (and continue to be affected) by recent changes in the security environment; however, a great deal of continuity remains in the way the DON organizes itself. Those changes will continue to shape the types of analytic tools that will be required to provide supporting cost analyses. The DON continues to change and adapt to new operational and budgetary realities. The cost analyst should be alert to those changes because they will affect the organizational structure; the creation, ownership, and flow of important costing data and other information; and the decisionmaking context for allocating resources.

What follows is a set of broad observations that can be made about the DON, the Navy, and the Marine Corps and that can assist in understanding why costing is performed as it is in these organizations. Each of the following sections presents considerations in the order of their importance to the cost analyst.

ORGANIZATIONAL CONSIDERATIONS

Unlike the Departments of the Army and the Air Force, the Department of the Navy houses two sister services—the Navy and the Marine Corps. This situation generates a unique requirement to coordinate the planning, programming, budgeting, research, development, acquisition, and operation of mutually reinforcing sea, air, and ground forces. It also places demands on the PPBS and RDA processes to achieve a high level of coordination. *It is therefore often*

inappropriate to analyze force structure or operational issues with respect to a single DON service or component.

Equally important is that careful coordination and integration of Navy and Marine Corps forces are required to manage the DON's varied portfolio of peacetime and potential wartime operations. Consequently, a very complex decisionmaking process is used that involves a combination of service-centered and joint Navy–Marine Corps planning and execution. Likewise, when costing is carried out in the DON, this complexity makes it necessary to consider direct and indirect implications for a wide variety of organizations and warfighting capabilities. *Since data, models, and other costing tools may be designed to support costing of Navy, Marine Corps, DON-wide, or even joint activities, it is critical for the cost analyst to ensure that the costing information he or she is using is appropriate for the cost analysis being performed.*

STRATEGY, FORCE STRUCTURE, AND OPERATIONS

Recent changes in the Navy's basic warfighting strategy, and its traditional approach to organizing forces to execute that strategy, contribute additional complexity to DON cost analyses. That strategy has been changed from a concept called the Maritime Strategy—which focused on naval battle forces' securing command of the seas against large-scale naval threats—to a new strategy called . . . *From the Sea*[1]—which focuses on naval expeditionary forces capable of projecting U.S. power into the littoral regions of the world. *This new concept can be expected to emphasize different types of operational and force-structure issues than in the past, and may further stress the importance of subject-matter experts and cross-cutting reviews that consider requirements for both warfighting and supporting operations.*

The Navy and Marine Corps are task-organized for operations, resulting in alternative definitions of force structure for administrative and operational purposes: Resourcing information is collected and organized by administrative unit (e.g., Marine Division), but cost analysts may be called upon to cost the implications of changes in oper-

[1]U.S. Department of the Navy (1993).

ational force structure (e.g., Marine Expeditionary Force [MEF]). *The cost analyst needs to remain alert to the unit of force structure that is being costed.*

Although the basic structure and mission have remained largely unchanged, these task organizations have often changed name and composition, greatly complicating efforts to make comparisons over time. For example, until recently, the basic operational unit for the Marine Corps was the Marine Expeditionary Brigade (MEB), which was formerly called the Marine Amphibious Brigade (MAB). More recently, MEBs have been replaced by brigade-size MEFs. Similarly, the battleship-based Surface Action Group (SAG) is no longer a part of the force structure and has been reorganized, typically around a cruiser and destroyers. *With constantly changing definitions of task organizations, the cost analyst should ensure that historical cost factors and estimates are relevant and/or adjusted to allow comparisons with the task organization at hand.*

There are, in fact, at least four ways to treat the DON's operating force structure: (1) as high-level force aggregates, such as operating fleets or Fleet Marine Forces; (2) as operational commands, such as task groups or MEFs; (3) as administrative commands, such as type commands (TYCOMs) or divisions; or (4) in terms of primary force elements, such as ships, battalions, and air wings, squadrons, or detachments. Force-structure decisions may be stated in any of these terms, requiring the cost analyst to be able to characterize the associated manpower, equipment, operating levels, and other attributes associated with each alternative force-element definition. *The level of analysis will affect the types of costs that are included or excluded.*

Because of the mutually reinforcing nature of the different force elements, decisions about one element of the Navy or Marine Corps force structure do not occur independently of changes in other elements, either within the same service or across services. For example, Marine Security Force requirements may vary with the number and operating levels of Navy carriers for which the Marines provide shipboard security; Navy personnel provide medical and dental care for the Marine Corps; and potential operations of the Marine Corps Norway Air-Landed Marine Expeditionary Brigade (NALM) depend on Air Force airlift of troops to marry up with NALM equipment in

deployed locations. *Costing exercises that fail to recognize these dependencies and relationships will underestimate costs; on the other hand, some cost estimates poorly document what is included, leading to the possibility of double-counting.*

Certain characteristics influence adjustments in Navy and Marine Corps force structure. In the Navy, the very long lead times for ship construction make force expansion a slow process and create commitments that are not easily altered when budgets decline. In the Marine Corps, the minimum number of divisions and air wings is specified by law. Furthermore, about 70 percent of "green dollars" (the term given to the Marine Corps' share of the DON appropriation, and contrasted with "blue dollars," which connotes the Navy's share) are devoted to military personnel pay and support programs that do not easily respond to budget fluctuations. *The responsiveness to top-line budget changes of individual line items and spending categories is neither proportional nor necessarily easily predicted.*

The Navy and Marine Corps deploy continuously, even during peacetime, to accomplish peacetime force projection and conduct contingency operations. Although unit training benefits from such deployment activities, training is not the sole motivation for peacetime operations and, hence, is not the sole cause of peacetime operating costs. Further, the large portion of Navy and Marine Corps forces that are usually deployed during peacetime makes the distinction between training operations and peacetime mission operations somewhat ambiguous. It also greatly affects force structure and operations at home, because it drives personnel rotation, training and overhaul schedules, and other considerations. *It is often very difficult to distinguish between costs associated with peacetime deployments and those associated with training.*

PLANNING, PROGRAMMING, AND BUDGETING

The DON's *Program Objective Memorandum* (POM) development process is one of two critical processes within which major allocative decisions are made. Through the *assessments process*, the DON develops overarching maritime strategy in the context of *Defense Planning Guidance* (DPG), and establishes guidance for overall force composition early in a PPBS cycle. The assessments process separately considers warfare, warfare support, and general support task

areas, with costing for the warfare areas confined to *investment accounts*. This overarching maritime strategy is documented in what is called the *White Paper Revision*. *The focus on integrated mission-area assessments and broad participation in the assessments process help to ensure that critical dependencies and interactions are taken into account. However, such breadth may also increase the difficulty for the cost analyst of predicting the outcomes of the deliberations.*

To understand how the Navy contributes to DoD's PPBS process, cost analysts need to keep in mind the following factors:

- Although the Department of the Navy submits a single *Program Objective Memorandum*, portions of the POM are developed separately by the Navy and Marine Corps following a "*blue–green split*" of the DON Total Obligational Authority (TOA). The Navy programs both its own blue-dollar programs and, in coordination with Marine planners, "blue-in-support-of-green" programs, such as naval aviation, which includes Marine Corps aviation programs. The Marine Corps programs its green-dollar portion, which includes not only Marine Corps–specific appropriations, such as Military Personnel, but also a small share of certain Navy appropriations, such as Military Construction. *The cost analyst may be asked to consider changes in any or all of three separate budgets: for the Navy, for the Marine Corps, or for the combined DON submission.*
- During POM development, the Navy allocates portions of its (blue-dollar) fiscal guidance among a few *resource sponsors*, agencies that develop partial POMs *(Sponsor Program Proposals* [SPPs]) for their areas of responsibility. For example, the resource sponsor for Air Warfare develops a proposal for resourcing aircraft and the carriers on which some aircraft deploy, and the proposal covers research and development; procurement and modifications; mission-related training; base operating support for mission-related installations and activities; and aircraft and ship overhauls and maintenance. This sponsorship system centralizes program development in the hands of a few resource sponsors rather than in the hands of the far-more-numerous *claimants* (i.e., execution organizations). Consequently, many important trade-offs, such as between acquisition and maintenance and/or modification of weapons systems, are at least par-

tially internalized within a sponsorship area. *During some phases of the DON PPBS, the resource sponsors may be the best sources of information on their portions of the DON program.*

- The Marine Corps' procedure for program development is quite different from the Navy's. The Marine Corps allocates portions of its (green-dollar) allocation to sponsors organized by appropriation. Moreover, the Marine Corps allocates only a *core portion* of green dollars—a portion deemed just adequate to maintain existing programs and prior commitments—at the outset of program development, and, when funding new initiatives, encourages competition across functions, warfare areas, and appropriation areas. *The cost analyst can to some extent bound the uncertainty in Marine Corps cost analyses by identifying the size of the core and potential ranges of funding for the new initiatives.*
- Whereas the Marine Corps program provides resources for its ground equipment, units, and operations, air resources for both services are managed by the Navy. The Marine Corps participates in programming air-related resources, of course, but development of the overall DON air-related program occurs through the Navy rather than through the Marine Corps programming process; hence, data sources on air-related programs are centralized within the Navy's Air Warfare community. *For an integrated view of Naval Air, the cost analyst should turn to the Navy's Air Warfare community.*
- Because of the web of relationships among elements of the force structure and between force structure and support infrastructure, the DON tends to rely more on subject-matter experts, cross-cutting reviews, layered decisionmaking, program-by-program competition for limited funds, and baselines drawn from previous decision cycles. Although models and databases are widely used, they are generally developed on an ad hoc basis to serve special needs and users. Given the magnitude of the changes in the force structure, models that were designed to assist in the analysis of marginal changes to force structure may not adequately capture the actual cost implications. *Because of the distributed environment within which the DON PPBS is performed, perhaps one of the most important tools of the cost analyst is the telephone Rolodex. At a minimum, the Rolodex should include the offices of the Deputy Chief of Naval Operations, N-8*

(DCNO, Resources, Warfare Requirements and Assessments), N-80 (Programming), N-81 (Assessments), and N-82 (Fiscal Management, dual-hatted as the Naval Comptroller [NAVCOMPT]). Within the Marine Corps, the players of interest are the Deputy Chief of Staff (DCS), Requirements and Programs, and the Fiscal Director of the Marine Corps.

RESEARCH, DEVELOPMENT, AND ACQUISITION

Research, Development, and Acquisition (RDA), the second process in which major allocative decisions are made within the DON, is highly integrated with, and intrinsic to, the PPBS process. In effect, the systems commands (including the Marine Corps System Command [MARCORSYSCOM]) perform weapon-system capability and cost analyses much as resource needs are analyzed for other purposes, and make this information available for the POM. Thus, the cost analyst should be wary of costing information that is inconsistent across the PPBS and RDA processes, and seek consistent data.

Within the DON, the systems commands (including MARCORSYSCOM), Program Executive Officers (PEOs), and Direct-Reporting Program Managers (DRPMs) are among the more important creators and users of costing information. *The cost analyst is likely to rely on the systems commands, Program Executive Officers, and Direct-Reporting Program Managers for costing information on discrete weapon-system programs.*

In obtaining and examining costing information, the cost analyst should be aware of the following factors:

- Costing to support the DON RDA process differs little from costing for POM development, except for programs large enough to qualify for Defense Acquisition Board (DAB) review. Such programs generally include ship-building and most aircraft programs. Life-cycle cost estimates are developed for these programs and integrate a full range of costs, including operating and support costs. For smaller (non-DAB) programs, RDA program managers focus primarily on research and development and procurement costs, leaving operating and support issues to manpower and logistics support analysts in the assessments process. *Given the size of the program, the cost analyst may have to*

turn to several sources to acquire all the costing information necessary for his or her analyses.

- Operating and Support (O&S) costing exercises can differ in methodology, according to whether a weapon system or a force element is the unit of analysis. As might be expected, for ships, the results are quite similar; for air and ground units and equipment, they are not. *The cost analyst may wish to do both forms of costing—for the system and for the unit of which it is a part—to ensure that the full cost implications of a weapon system are well understood.*
- The Marine Corps rarely develops independent RDA programs large enough to require DAB review. Programs of that magnitude are normally undertaken jointly with another service (typically the Army), and that service takes the lead in preparing cost estimates. Consequently, the Marine Corps has limited need for developing methods and data sources to support DAB review requirements. *The cost analyst may occasionally need to interact with the Army's RDA community to acquire the data necessary for his or her cost analysis.*[2]

Navy resource sponsors and the Marine Corps can access a variety of databases to help project some of their program's resource needs. But much of POM development hinges on case-specific estimates supplied by claimants or developed from ad hoc queries rather than from generalized costing tools. Such situations are especially true in the Marine Corps, where claimants are a key source of new initiatives for program development. *The DON environment emphasizes professional interactions to ensure that all points of view are considered; such interactions create an extremely dynamic and diffuse environment for the cost analyst wishing to acquire data or understand the status of a particular program within DoD.*

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[2]For a contrasting discussion of the Army's costing environment, see Adele R. Palmer, *Cost Factors in the Army: Volume 1—The Decisionmaking Context*, Santa Monica, Calif.: RAND, R-4078/1-PA&E, 1992; and Adele R. Palmer and Eric V. Larson, *Cost Factors in the Army: Volume 2—Factors, Methods, and Models*, Santa Monica, Calif.: RAND, R-4078/2-PA&E, 1992.

Further, the unique characteristics in all three of the DON's weapon system dimensions—sea, air, and ground—condition how RDA is performed:

- Ship acquisitions are unique because key types of ships are purchased in small numbers, with each unit representing a major and costly force element in its own right. Production usually begins with a prototype or "lead" ship, followed by a pause before additional ships are constructed. Although considered an element of full-scale development, the lead ship is funded by procurement rather than R&D funds. Consequently, R&D costs as a share of total program acquisition costs are small relative to those of other types of procurement programs. Ship acquisition costing is also an unusually complicated exercise because the acquisition programs are often spread over a very large number of cost centers (shipyards, contractors, etc.). Programming in connection with ship acquisitions can also raise or amplify issues in resource coordination. For example, ship acquisitions can require construction of new facilities in support of research, development, testing, and evaluation (RDT&E). Costs for such construction will come out of the Military Construction account. Similarly, the long lead time for ship construction forces personnel requirements to be considered well in advance and recognized in the manpower authorizations process. *Costing for ship acquisition and operations and support may involve a great many more complexities and interactions than for other types of weapon systems.*
- Aircraft costing exercises differ from those in the Air Force because Navy and Marine Corps air wings use a combination of aircraft types and operate them in close coordination with ships and other force elements, and because O&S costing in the DON differs from that in the Air Force. *Cross-service comparisons should be made only after these critical differences are taken into account.*
- Ground-equipment issues differ from those in the Army because the Marine Corps rarely tackles truly large acquisitions independently and is small enough to permit a good deal of analysis and evaluation through direct contacts among the key players in the RDA decision processes.

CONCLUDING THOUGHTS

The Department of the Navy's complex organization and processes have had two major consequences. The first consequence is that the DON milieu emphasizes interactions of subject-matter experts in the context of panels, review groups, and other fora to ensure that all viewpoints are adequately represented in deliberations. Given the evolutionary nature of the new strategy articulated in . . . *From the Sea*, the reader might expect both that the prominence of such groups will increase in the immediate future and that the decision-making process will continue to evolve, since only with broad participation and continued adaptation will the new strategy be completely fleshed out.

The second consequence of the DON's organizational environment is not an absence of costing methods or tools, but rather a tendency to develop separate techniques and data support for different users—the need for generalized models that would capture the overall cost implications of changes in force structure or major weapon systems was never important enough to overcome this tendency. In the face of the force and infrastructure support changes that are now taking place, however, it appears likely that there will be pressures for more generalized, aggregate models. Taken together, the Department of the Navy can be seen to be a complicated, always-changing milieu that continuously adapts to better meet the challenges it faces.

Over the coming years, the DON faces a complex challenge in downsizing its force structure and supporting infrastructure, including significant fleet reductions and more base closures, and multiyear downward trends in procurement. Three factors especially will contribute to the complexity:

- Changes in both operational requirements and budgetary pressures for the foreseeable future will contribute to additional changes in the DON's force structure.
- During the next decade, the DON will undertake considerable downsizing relative to its past plans, aiming toward a fleet that is organized around 12 aircraft carriers (one of which will be in the Naval Reserves) and smaller by at least 100 deployable ships, and that reflects a reduction in Navy end-strength from about

590,000 in 1990 to 442,000 in 1995, and Marine end-strength from 196,000 to 174,000 over the same period.

- The simultaneous retirement and mothballing of force structure and the realignment and closure of Navy bases and other facilities is likely to complicate future cost analyses that must consider these issues.

As this report demonstrates, despite these changes, there is a great deal of continuity in how the DON organizes itself to meet such challenges. Nevertheless, we note that since late 1992, when most of the research for this report was completed, the Navy has undergone a significant reorganization. In the main, however, much continuity has been maintained in the DON organization, and in its PPBS and RDA processes.

Although we have updated it where possible, this report seeks to document the broader, more enduring features of the DON and to detail the DON as it looked in late 1992. The reader, however, should remain alert for further changes in Navy organization and decision processes that could affect the observations made here: The extent to which the DON organization or the dynamics of the DON PPBS and RDA processes will continue to mirror those of the past is not clear.

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ACRONYMS AND ABBREVIATIONS

AAW	Anti-aircraft warfare
ACAT	Acquisition Category
ACE	Aviation combat element
ACF	Airlifted Contingency Force
ACIB	Air Characteristics Improvement Board
ACNO	Assistant Chief of Naval Operations
ACS	Assistant Chief of Staff
ADM	*Acquisition Decision Memorandum*
AEW	Airborne early warning
AGR	Active Guard/Reserve
ANGLICO	Air/naval gunfire liaison companies
AP	*Acquisition Plan*
APBA	*Acquisition Program Baseline Agreement*
APM	Acquisition Program Manager
APN	Aircraft Procurement, Navy
ARB	Acquisition Review Board
ARC	Acquisition Review Council
ARG	Amphibious readiness group
ASO	Aviation Supply Office
ASW	Antisubmarine warfare
AT	Active training
ATD	Advanced Technology Demonstration
ATO	Afloat Training Organization
ATP	Advanced Technology Panel
AVN	Aviation
BAM	*Baseline Assessment Memorandum*
BBG	Battleship battlegroup
BES	Budget Estimate Submission

BOS	Base Operating Support
BRAC	Base Realignment and Closure
BSO	Budget-Submitting Organization
BUMED	Bureau of Medicine and Surgery
BUPERS	Bureau of Naval Personnel
CAIG	Cost Analysis Improvement Group
CARGRU	Carrier group
CB	Naval construction battalion
C^3I	Command, control, communications, and intelligence
C^4I	Command, control, communications, computers, and intelligence
C^4I^2	Command, control, communications, computers, intelligence, and interoperability
CCDR	Contractor Cost Data Reporting
CE	Command element; current estimate
CEB	CNO Executive Board
CESE	Civil engineering support equipment
CG	Commanding General
CHINFO	Chief of Naval Information
CHNAVPERS	Chief of Naval Personnel
CINC	Commander in chief
CJCS	Chairman of the Joint Chiefs of Staff
CMC	Commandant of the Marine Corps
CNA	Center for Naval Analyses
CNAVRES	Chief of Naval Reserves
CNET	Chief of Naval Educational Training
CNO	Chief of Naval Operations
COEA	Cost and Operational Effectiveness Analysis
COMMSC	Commander, Maritime Sealift Command
COMNAVAIR	Naval Air Command
COMNAVRESFOR	Commander, Naval Reserve Force
COMSUB	Submarine force command
COMSUBPAC	Commander, Submarine Force, Pacific
CONUS	Continental United States
CPAM	*CNO Program Analysis Memoranda*
CPFG	*Consolidated Planning and Fiscal Guidance*
CRUDESGRU	Cruiser-destroyer group
CSSE	Combat service support element

CVBG	Carrier battle group
DAB	Defense Acquisition Board
DACNO	Deputy Assistant Chief of Naval Operations
DAE	Defense Acquisition Executive
DASN	Deputy Assistant Secretary of the Navy
DCNO	Deputy Chief of Naval Operations
DCS	Deputy Chief of Staff
DDI	Decisions and Designs, Inc. (private-sector company)
DE	Development estimate
DEC	Digital Equipment Corporation
DIRNAVRES	Director of Naval Reserve
DNCPPG	*DON Consolidated Planning and Programming Guidance*
DoD	Department of Defense
DON	Department of the Navy (U.S.)
DONPIC	DON Program Information Center
DPG	*Defense Planning Guidance*
DPRB	Defense Planning and Resources Board
DPSB	DON Program Strategy Board
DRB	Defense Resources Board
DRPM	Direct-Reporting Program Managers
ECM	Electronic countermeasures
ESC	Executive Steering Committee (Navy Staff)
EW	Electronic warfare
FDMC	Fiscal Directorate, Marine Corps; Fiscal Director of the Marine Corps
FFRDC	Federally funded research and development center
FHN&MC	Family Housing, Navy, and Marine Corps
FM	Fiscal Management
FMF	Fleet Marine Forces
FNIP	Foreign National Intelligence Program
FSD	Full-scale development
FSSG	Force service support group
FTS	Full-time support
FY	Fiscal year
FYDP	*Future Year Defense Plan*
GCE	Ground command element
H&S	Headquarters and support

HQMC	Headquarters, Marine Corps
I&L	Installations and Logistics
IBR	Investment Balance Review
ILS	Integrated logistics support
ILSA	Integrated logistics support analysis
IPAS	Integrated Program Analysis System
IPL	*Integrated Priority List*
IRR	Individual ready reserve
JCS	Joint Chiefs of Staff
JMNA	*Joint Military Net Assessment*
JSPD	*Joint Strategic Planning Document*
LANTCOM	Atlantic Command
LANTFLT	Atlantic Fleet
LCC	Life-cycle cost
M&RA	Manpower and Reserve Affairs
MAC	Military Airlift Command
MAF	Marine Amphibious Force
MAG	Maritime action group
MAGTF	Marine Air-Ground Task Force
MARCORSYSCOM	Marine Corps Systems Command
MarDiv	Marine Division
MAWs	Marine Air Wings
MCAS	Marine Corps air stations
MCCDC	Marine Corps Combat Development Command
MCCP	*Marine Corps Campaign Plan*
MCON	Military Construction, Navy
MCONR	Military Construction, Navy Reserve
MCOTEA	Marine Corps Operational Test and Evaluation Activity
MCPDM	Marine Corps Program Decision Meeting
MCPRU	Marine Corps Program Review Update
MCRDAC	Marine Corps Research Development and Acquisition Command (now MARCORSYSCOM)
MDA	Milestone Decision Authority
MDS	Mission/design (code) series
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MEU	Marine Expeditionary Unit

MFP	Major Force Program
MILCON	Military Construction
miltech	Military technician
MLRP	*Marine Corps Long-Range Plan*
MMP	*MAGTF Master Plan*
MNS	*Mission Needs Statement*
MPF	Maritime Prepositioning Force
MPMC	Military Personnel, Marine Corps
MPN	Military Personnel, Navy
MPR	Mid-POM Review
MPS	Maritime Repositioning Squadron
MPT	Manpower, Personnel, and Training
MSC	Military Sealift Command
MSG	Marine Security Guard
NAE	Navy Acquisition Executive
NALM	Norway Air-Landed MEB
NAPDD	*Non-Acquisition Program Definition Document*
NARM	Navy resource model
NATF	Naval Expeditionary Task Force
NATG	Naval Expeditionary Task Group
NAVAIR	Naval Air Systems Command
NAVCENTFLT	Central Fleet (Navy)
NAVCOMPT	Naval Comptroller
NAVDAC	Naval Data Automation Command
NAVFAC	Naval Facilities Engineering Command
NAVINTCOM	Naval Intelligence Command
NAVLEGSVCCOM	Naval Legal Service Command
NAVOCEANCOM	Naval Oceanography Command
NAVSEA	Naval Sea Systems Command
NAVSECGRU	Naval Security Group Command
NAVSOFLT	Southern Fleet (Navy)
NAVSPACECOM	Naval Space Command
NAVSUP	Naval Supply Systems Command
NAVTELCOM	Naval Telecommunications Command
NCA	Naval Center for Cost Analysis
NCF	Naval construction force
NEAT	Naval embarked advisory team
NEF	Naval Expeditionary Force
NHBS	Navy Headquarters Budgeting System

NHPS	Navy Headquarters Programming System
NIF	Navy Industrial Fund
NISCOM	Naval Investigative Service Command
NMPC	Naval Military Personnel Command (now Bureau of Naval Personnel)
NNOB	Non-Nuclear Ordnance Board
NNOP	Non-Nuclear Ordnance Planning (board)
NPDM	Navy Program Decision Meeting
NRF	Naval Reserve Force
NSF	Navy Stock Fund
O&M	Operations and maintenance
O&S	Operating and Support
OCN	Office of the Chief of Naval Research
OJAG	Office, Judge Advocate General
OLA	Legislative Assistant to the Commandant (Marine Corps)
OMB	Office of Management and Budget
OMMC	Operations and Maintenance, Marine Corps
OMMCR	Operations and Maintenance, Marine Corps Reserve
OMN	Operations and Maintenance, Navy
OMNR	Operations and Maintenance, Navy Reserve
ONR	Office of Naval Research
ONT	Office of Naval Technology
OP	Other Procurement
OPA	Office of Program Appraisal
OPLANS	Operational plans
OPN	Other Procurement, Navy
OPNAV	Office of the Chief of Naval Operations
OPRC	OPNAV Program Review Council
OPTEVFOR	Operational Test and Evaluation Force
ORD	*Operational Requirements Document*
OT&E	Operational testing and evaluation
PACFLT	Pacific Fleet (Navy)
PACOM	Pacific Command
PAT	Program Analysis Toolkit
PB	President's Budget
PBD	Program Budget Decision
PCFP	*Program Change Funding Proposal*
PCG	Program Coordination Group (Marine Corps)

PDASN	Principal Deputy Assistant Secretary of the Navy
PdE	Production estimate
PDM	*Program Decision Memorandum*
PDRC	Program Development Review Committee
PE	Planning estimate
PEG	Program Evaluation Group
PEO	Program Executive Officer
PERSTEMPO	Fraction of year a sailor spends on ship, away from home
PHIBRON	Amphibious readiness squadron
PM	Program manager
PMC	Procurement, Marine Corps
POM	*Program Objective Memorandum*
PP&O	Plans, Policies, and Operations
PPB	Program Policy Board
PPBS	Planning, Programming, and Budgeting System
PRC	Program Review Committee
PS	Prior service
PWG	POM Working Group
R&P	Requirements and Programs
R&SA	*Readiness and Sustainability Appraisal*
RAD	Resource Allocation Database (previously Resource Allocation Display)
RDA	Research, Development, and Acquisition
RDDS	*Research and Development Descriptive Summary*
RDT&E	Research, development, testing, and evaluation
RDT&EN	Research, Development, Test, and Evaluation, Navy
RE&S	Research, Engineering, and Systems
READRON	Readiness squadron
RFP	Request for Proposal
RIC	Resource identification code
ROC	*Required Operational Capability*
ROTC	Reserve Officer Training Corps
RPMC	Reserve Personnel, Marine Corps
RPN	Reserve Personnel, Navy

R3B	Resources & Requirements Review Board
S&L	Shipbuilding and Logistics
SAG	Surface Action Group
SAR	*Selected Acquisition Reports*
SCIB	Ship Characteristics Improvement Board
SCN	Shipbuilding and Conversion, Navy
SECNAV	Secretary of the Navy
SELRES	Selected reserves
SEMP	*Supporting Establishment Master Plan*
SEW	Surface electronic warfare
SHAPM	Ship Acquisition Program Manager
SLEP	Service Life Extension Program
SMCR	Selected Marine Corps Reserves
SPAWAR	Space and Naval Warfare Systems Command
SPMAGTF	Special Purpose Marine Air-Ground Task Force
SPP	*Sponsor Program Proposal*
SRIG	Surveillance, reconnaissance, and intelligence group
SRP	Strategic Readiness Panel
SSPO	Strategic Systems Project Office
STO	Science and Technology Objectives (Marine Corps)
SWA	*Summary Warfare Assessment*
T/E	Table of equipment
T/O	Table of organization
TAP	The Army Plan
TAR	Training and Administration of Reserves
TE	Task element
TEMP	Test and evaluation master plans
TF	Task force
TG	Task group
TLWR	Top-Level Warfare Requirements
TMS	Type/model/series (code)
TOA	Total Obligational Authority
TOW	Heavy anti-tank (weapon)
TRADOC	Training and Doctrine Command (Army)
TU	Task unit
TYCOM	Type commander
UAV	Unmanned Aerial Vehicle

UIC	Unit identification code
URG	Underway replenishment group
USACOM	U.S. Atlantic Command; previously LANTCOM
USCENTCOM	U.S. Central Command
USD(A)	Under Secretary of Defense for Acquisition
USMC	U.S. Marine Corps
USNAVEUR	U.S. Naval Forces, Europe
USSOUTHCOM	U.S. Southern Command
V/STOL	Vertical/short takeoff and landing
VAMOSC-SHIPS	Visibility and Maintenance of Operating and Support Costs—Ships
VCNO	Vice Chief of Naval Operations
WBS	Work Breakdown Structure
WMP	*War and Mobilization Plan*
WPN	Weapons Procurement, Navy
WRB	Warfare Requirements Board

Chapter One

INTRODUCTION

The current push to downsize the U.S. Department of Defense has raised many questions on cost trade-offs for the U.S. Department of the Navy (DON). The questions can be arranged into a hierarchy of difficulty. The simplest questions are concerned with equipment items and their directly associated personnel:

What are the likely cost consequences of

- replacing F-14s with A/FXs?
- reducing the carrier fleet to *N* ships?

Next come questions about forces, which are collections of equipment and personnel:

What are the likely consequences of

- replacing *X* squadrons of Navy F/A-18s with Marine Corps F/A-18s?
- closing *Z* naval shipyards?

Most difficult are questions about organizational structures:

- What are the likely consequences of removing all responsibility for space systems and activities from the DON?
- Where are the focal points in the DON organization and decisionmaking context for seeking answers to these types of questions? What sorts of data and estimating models are available to assist in answering the above questions? What shortcomings are

there in the available data and models that can produce distortions in the analyses?

This study highlights the DON organization and decisionmaking processes that cost analysts must understand to be able to understand the purposes, development methods, terminology, interpretation, uses, and limitations of DON costing information.

DON cost analysis is concerned with the costs of resourcing (personnel, equipment, facilities, etc.) Navy missions. The DON has many organizational elements and two cross-cutting, decisionmaking structures—the operational and administrative chains of command. Resources are assigned to or controlled by organizational elements and are subject to decisions by the elements in both chains of command. Further, it should be kept in mind that various offices shown in the DON organization employ resources in the conduct of their administrative and other responsibilities.

The DON and its elements have evolved many databases and estimating models to assist in assessing the cost consequences of various decisions. Some of the decisions involve specific and/or itemized resources (e.g., submarines, fighter aircraft) and some involve aggregations of resources (e.g., carrier battle groups, Marine air wings). Many shortcuts have been taken in developing databases and models to address cost issues regarding these resources, particularly the aggregations of resources, because the types of decisions that were being addressed were not particularly sensitive to variations in the aggregations, and the shortcuts saved considerable time and effort in the analysis as well as the data collection.

The United States is entering an era in which the decisions about defense allocation are highly sensitive to such shortcuts, so it is important for cost analysts to understand the existing data sources and models and what questions can and cannot be addressed using them. It is also important that users of cost analyses know that the work upon which they are basing their decisions will not ultimately distort the results they expect to obtain from the decisions.

Between 1991, when we began our research, and late 1992, when most of the research for this report was completed, the Navy began a major reorganization involving the Office of the Chief of Naval Operations (OPNAV) staff, the Planning, Programming, and Bud-

geting System (PPBS) process, and a realignment of the administrative organizational structure to better support the operational structure. As of late 1992, many of the new reporting relationships and responsibilities were fairly clear; however, some areas remain in which decisions are still to be taken and documentation does not yet exist. We have attempted to identify those areas where issues have not yet been resolved while capturing whatever new terminology and changes in reporting relationships or operating philosophy appear to be forthcoming. Regarding those changes that have already taken place, while many actors and their roles and responsibilities have changed, in the main there appears to have been a great deal of continuity in the DON organization, and in its PPBS and Research, Development, and Acquisition (RDA) processes. Thus, this study both documents these broader, more enduring features of the DON, and describes in some detail the DON as it looked in late 1992, with updated information incorporated where possible.

Inevitably, some of this information will soon be outdated by organizational changes, mission reorientation, and development of new management information systems and databases. In future years, however, this document may still serve as an initial introduction to DON terminology, organizational structure, and costing issues, and as a general guide to where and how a user may obtain more current information.

The study is divided into five chapters. The DON organization is discussed in terms of elements and decision structures, in Chapter Two. Such information is essential to understanding the general context for DON costing as well as the material presented in the remainder of the report. The next two chapters describe the two major decision processes that are intensively concerned with costs—Planning, Programming, and Budgeting, Chapter Three, and Research, Development, and Acquisition, Chapter Four. Chapter Five concludes the report with a summary of current costing issues. The Appendix presents selected nomenclature and force-structure data. It is followed by a bibliography.

Chapter Two

DEPARTMENT OF THE NAVY ORGANIZATIONAL STRUCTURE

The Department of the Navy has been described as a "replica" of the Department of Defense (DoD). William Kaufmann elaborates as follows:

> [The DON] has its own army in the form of the U.S. Marine Corps. It has its own navy, naturally. And it actually has three air forces: one for the Marine Corps, one that sails about on the Navy's aircraft carriers, and one that is land based and engages primarily in anti-submarine warfare (ASW). It even has its own nuclear forces made up of fleet ballistic missile submarines and a substantial array of shorter-range nuclear delivery systems that can be launched from carriers, surface combatants, and attack submarines. As might be expected, it also owns or rents a number of ships that it uses to transport cargo, deploy reinforcements overseas, and pre-position weapons, equipment, and supplies near some of the more troubled regions of the world. Since neither the Army nor the Air Force has managed to accumulate such a diversified portfolio of capabilities, it is little wonder that the Navy consistently earns more than a third of the defense budget.[1]

It is also little wonder that the DON is organizationally complex, as this chapter demonstrates.

The DON organizational structure is important to the cost analyst for a number of reasons: (1) to define the basic military unit where resource decisions are implemented, (2) to identify related units that might be affected by a decision, (3) to recognize important differ-

[1] Kaufmann (1987), p. 3.

ences among types of units and the functions they perform, and (4) to be familiar with terminology commonly encountered in Navy and Marine Corps costing information sources. This chapter provides a broad introduction to the DON organization, emphasizing basic information relevant to cost analysis.

Figure 2.1 provides an overview of the major elements in the DON management structure: the executive structure, the operating forces, and the shore establishment.[2] Our discussion covers each of these establishments in the large (i.e., including both Navy and Marine, active and reserve elements).[3]

THE DON EXECUTIVE STRUCTURE

The Executive Structure is located in the Washington, D.C., area, primarily at the Pentagon and the nearby Navy Annex. It establishes policy, direction, and control over the naval Shore Establishment and Operating Forces. Primary authority rests with the Secretary of the Navy (SECNAV), the Under Secretary of the Navy, the Chief of Naval Operations (CNO), and the Commandant of the Marine Corps (CMC).

The Secretary of the Navy is a civilian responsible for the overall organization, administration, and operation of the Department of the Navy; the Under Secretary is his immediate deputy and the Navy Acquisition Executive. The offices of two assistant secretaries are of particular interest to cost analysts: Financial Management, which oversees the Navy Comptroller's budgeting activities, is discussed in Chapter Three; Research, Development, and Acquisition is discussed in Chapter Four.

The Chief of Naval Operations is the senior military officer of the Navy. He heads the Office of the Chief of Naval Operations (OPNAV),

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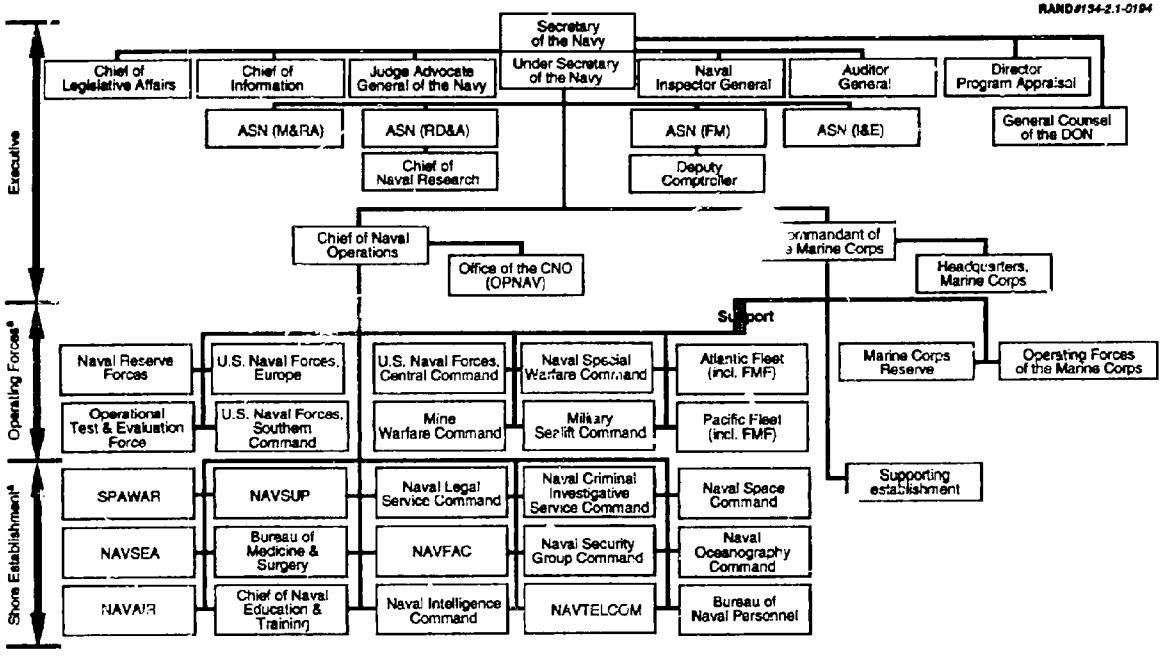
[2]Throughout this report we attempt to identify all the organizational elements of the DON, but emphasize only those that are most important to cost analysts. If an organization is not described in detail, it is because it was deemed to be less important to costing issues.

[3]During wartime, the Coast Guard may be assigned to the DON and be managed by its executive structure. In peacetime, however, the Department of Transportation is responsible for administering the Coast Guard. The Coast Guard is not discussed in this report.



[a]Also includes other designated activities not shown on the chart that are under the command or supervision of the organizations depicted.

Figure 2.1— Organizational Structure of the Department of the Navy

provides administrative direction to the Operating Forces of the Navy, oversees the Navy's Shore Establishment, and represents the Navy in the Joint Chiefs of Staff (JCS). The CNO and OPNAV play a pivotal role in planning naval force structure and programming resources for forces and their supporting organizations.

The U.S. Marine Corps (USMC) is a separate military service within the Department of the Navy. It is headed by the Commandant of the Marine Corps, a four-star general and, like the CNO, a member of the JCS. The Commandant is responsible for the administration, discipline, internal organization, training requirements, efficiency, and readiness of the Marine Corps. The Commandant's command includes (1) the Headquarters, Marine Corps (HQMC); (2) the Marine Corps supporting establishment; and (3) the Marine Corps Reserve.

Like the CNO and OPNAV, the Commandant and HQMC play a key role in force planning and resourcing. However, many of the matters addressed by HQMC are ultimately managed jointly for the Navy and Marine Corps; hence, Marine Corps representatives serve on most staffs in the Office of the Secretary of the Navy and OPNAV.[4]

OPERATING FORCES

At the end of fiscal year 1991, the DON Operating Forces consisted of 528 deployable battle-force ships (including 12 carriers and four squadrons of Fleet Ballistic Missile submarines),[5] 12 active and two reserve carrier air wings in the Navy, three active and one reserve

[4]Before the Navy's 1991–1992 reorganization, for example, the overall naval flying program was developed under the leadership of the Deputy Chief of Naval Operations (DCNO) for Air Warfare (OP-05) and was supported by a single DON budget line item; however, to ensure integration of the two services' air arms, the Marine Deputy Chief of Staff for Aviation served as an Assistant DCNO for Air Warfare. Under the reorganization, the office responsible for Air Warfare (designated N88, headed by a three-star) became an Assistant Chief of Naval Operations (ACNO, a two-star), and a Marine officer no longer automatically serves as the DACNO.

[5]In 1981, then-Navy Secretary John Lehman instituted a method of measuring the Navy fleet in terms of *deployable battle forces*, which included a mixture of active and reserve ships but excluded certain reserve ships and auxiliaries that were not considered deployable. For example, the count of deployable carriers is one short of the number in inventory because one is normally in a Service Life Extension Program (SLEP) overhaul at any given time. The numbers in the text above were calculated by Lehman's method of accounting.

Marine Corps divisions, and three active and one reserve Marine aircraft wings.[6] As a result of former Secretary of Defense Les Aspin's 1993 "Bottom-Up Review" (a reassessment of force-structure requirements), by the end of the decade the DON is expected to dwindle from 443 to roughly 350 ships organized around 12 carriers (one of which will be a full-time reserve and/or training carrier), 16 or so ballistic missile submarines, with a Marine Corps continuing to consist of three active Marine Divisions, and with similar cuts in the remaining DON force structure.

Such forces are responsible for four primary missions: sea control, power projection, strategic sealift, and strategic deterrence.[7] The Navy's principal warships are its aircraft carriers and submarines, both categories of which include some ships that are nuclear powered.[8] However, the vast majority of the Navy's fleet are ships and craft of other kinds—cruisers and destroyers; amphibious ships and craft; patrol ships and craft; auxiliary ships, such as oilers, ammunition and stores ships, tenders, and hospital ships; mine warfare ships and craft; and service craft, such as floating dry docks and submergence rescue vehicles. When the Navy goes to sea, it takes its support base (auxiliary ships) and airpower (carriers and air wings) with it, enabling it to conduct military operations where there are no fixed land bases.

The Marine Corps is a *combined-arms force*, possessing limited armor, heavy artillery, and a large, tactical air arm. Marines specialize in conducting operations from sea bases—helicopter bases, vertical/short takeoff and landing (V/STOL) bases, logistics support bases, assembly areas, attack positions, and reserve staging areas—that enable them to assemble, prepare, and be equipped and sup-

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[6]Military personnel strength stood at close to 600,000 for the active Navy and 200,000 for active Marines; it was supplemented by more than 150,000 in the Naval Reserve and over 40,000 in the Marine Corps Reserve.

[7]In addition, the Navy contributes to peacetime drug interdiction activities commanded by the Coast Guard. Coast Guard Law Enforcement and Tactical Law Enforcement Detachments have been placed on Navy ships to conduct boardings of suspected drug smugglers.

[8]Currently, 16 of these submarines are a part of the Fleet Ballistic Missile force and have a strategic mission.

plied without relying on land-based infrastructure.[9] This ability to prepare and deploy into areas with little or no existing logistical capability is the reason the Marine Corps is described as an *expeditionary force.*[10]

If the three DoD military departments were arrayed on a scale of overall posture, the Army would lie at an extreme for standing down during peacetime, the Air Force would take the middle ground of immediate readiness combined with some peacetime operational activities (e.g., reconnaissance), and the DON would lie at the other extreme, with considerable ongoing operations for force projection and contingency response.[11]

Approximately 25–30 percent of the Navy's active component ships are in forward areas (e.g., Atlantic, Mediterranean, Pacific, and Indian Ocean) at any given time. Similarly, at any given time, one-third of the Fleet Marine Force is forward-deployed, one-third is returning, and one-third is preparing for deployment.[12] Many features of the DON, from its organizational structure to its peacetime resourcing patterns, are best understood in the context of this continual state of forward deployment.

Under the current U.S. defense organization, operational control is exercised (and requirements are specified) only through specified and unified commands, whereas the military services are responsible for equipping and training their forces for combat. This separation is reflected in the DON by a dual command structure, consisting of an operational chain of command—originating with the unified commanders in chief (CINCs)—and an administrative chain of command—headed by the Secretary of the Navy.

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[9]See Wilson (1989), pp. 220–221, for a brief discussion of the transformation of the Marine Corps, from 1930 to 1940, to a large force capable of waging amphibious operations against heavily defended Pacific islands.

[10]The view of the Marine Corps as an expeditionary force has historical precedent. Up until the 1960s, the task-oriented organization was known as the Marine Expeditionary Force (MEF; described below), but was renamed Marine Amphibious Force (MAF) in response to concerns that "expeditionary" had an undesirable colonial connotation. Recently the name reverted to MEF.

[11]Forward-deployed (and early-deploying) Army and Air Force units are, however, also at a high state of readiness.

[12]U.S. Marine Corps (1990a), p. 31.

The administrative chain of command is important to the cost analyst because it specifies the hierarchy through which resources flow to the Operating Forces and through which operating programs and budgets are executed. But it is the operational chain of command that explains how those resources are actually used in an operational context. Indeed, a cost analyst may be asked to assess the cost implications of a change in operational force elements (e.g., naval task groups or Marine Expeditionary Forces) rather than administrative elements (e.g., a Marine Division), or may be presented with cost or resource data organized by operational element rather than by administrative element. Consequently, the following discussion describes both the operational and the administrative chains of command—including the ongoing realignment of the administrative structure to better support the operational one—followed by supplementary information about the Naval and Marine Corps Reserves.

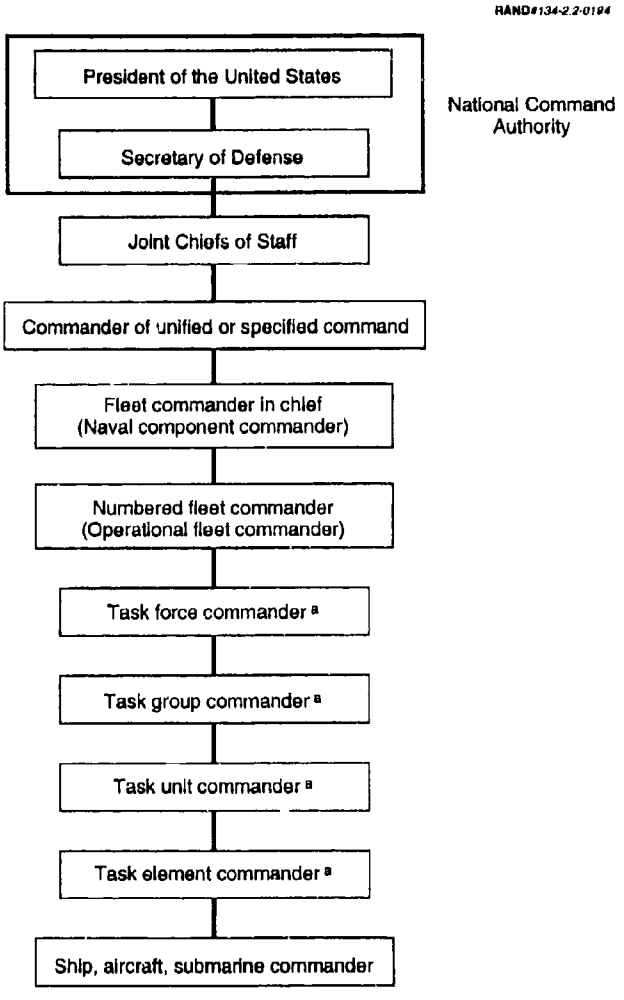
Operational Chain of Command

As illustrated in Figure 2.2, the operational chain of command originates with the President and passes through the Secretary of Defense and the Chairman of the Joint Chiefs of Staff (CJCS) to a unified or specified command, and then to assigned operational forces. The CINC of a unified command is customarily from the service that makes the largest material contribution to the theater.[13] Consequently, admirals have in the past been the CINCs for the Atlantic and Pacific Unified Commands (LANTCOM and PACOM).[14]

Within the unified commands are air, ground, and naval component commanders who direct operations of their service's contributed forces. The admirals who head LANTCOM and PACOM also head the Navy's two principal component commands, the Atlantic Fleet (LANTFLT), headquartered in Norfolk, Virginia, and the Pacific Fleet

[13]There is some evidence that this custom may not hold in the future, however.

[14]The U.S. Atlantic Command, now identified by the acronym USACOM, was recently given the responsibility for combatant command of nearly all deployable forces in the United States, and it is responsible for the advanced-level, joint training of these forces. See Miller (1994).



[a]Task force, task group, and task element commanders may not be present in some operations.

Figure 2.2—Operational Command Structure

(PACFLT), headquartered in Pearl Harbor, Hawaii.[15] The other three Navy component commands control forces assigned by the CNO or made available from LANTFLT or PACFLT; these commands are[16]

- U.S. Naval Forces, Europe (USNAVEUR), headquartered in Naples, Italy, under the unified U.S. European Command.
- The Southern Fleet (NAVSOFLT), headquartered in Panama, under the U.S. Southern Command (USSOUTHCOM).
- The Central Fleet (NAVCENTFLT), headquartered in Tampa, Florida, under the U.S. Central Command (USCENTCOM).

Below the naval component level, the Navy and Marine Corps have two principal types of operating forces each. The Navy's are the operating, or "numbered," fleets and the Military Sealift Command (MSC). The Marine Corps' are the Fleet Marine Forces (FMFs) and the Marine Security Force. These four operating elements are described below.

Naval Operating Fleets. Four numbered surface fleets are active during peacetime, providing both force-projection capabilities and unit training at sea.[17] Table 2.1 lists some deployment characteristics of these fleets.

As the table indicates, ships routinely rotate between the Second Fleet in the Atlantic and the Sixth Fleet in the Mediterranean, and between the Third Fleet in the eastern Pacific and the Seventh Fleet in the Pacific–Indian Ocean area. In rotations such as these, the ideal schedule is to deploy the ship for six months at a time, with an inter-

[15]The two principal naval component commands, LANTFLT and PACFLT, are known as "fleet commands"; there are "numbered fleets" within these commands and under other unified commands.

[16]All the component commands are considered "major" commands of the Operating Forces of the Navy. In addition, other major commands are Operational Test and Evaluation Force; Mine Warfare Command; Naval Special Warfare Command; and Naval Reserve Force.

[17]The Fifth Fleet does not normally operate during peacetime, but can be activated when appropriate.

Table 2.1

Deployment Characteristics of the Major Numbered Surface Fleets

Numbered Fleet	Deployment Characteristics
Second Fleet	Under CINCLANTFLT (and occasionally CINCUSNAVEUR), and headquartered in Norfolk, Virginia Operates in North Atlantic, Caribbean, Gulf of Mexico, South Atlantic Serves as NATO Striking Force Atlantic Meets operational requirements in Caribbean and off Central America Routinely rotates ships to Sixth Fleet Considered "home" or training fleet
Third Fleet	Under CINCPACFLT, and headquartered at Pearl Harbor, Hawaii Operates in Bering Sea, Gulf of Alaska, eastern and mid-Pacific Oriented toward anti-submarine warfare (ASW) Routinely rotates ships to Seventh Fleet
Sixth Fleet	Under CINCUSNAVEUR (and NAVCENTFLT, as required) Operates in Mediterranean, Gulf of Suez, and off East Africa, with periodic excursions to Black Sea Serves as NATO Striking Force South
Seventh Fleet	Under CINCPACFLT (and NAVCENTFLT, as required) Deploys in western Pacific (Northeast and Southeast Asia) and Indian Ocean, with periodic excursions into Sea of Okhotsk Largest numbered command

SOURCE: United Communications Group (1990). [United Communications Group maintains Periscope, a database containing information on U.S. Navy and Marine Corps organization, force structure, and equipment. It is also publisher of U.S. Naval Institute *Proceedings*, a useful source of information on Navy organization, processes, doctrine, and other characteristics.]

vening year spent in overhaul, in home port, or on local or area exercises. This schedule would meet the Navy's target for PERSTEMPO: the fraction of a year sailors spend on ships away from home, which should, ideally, be 50 percent or less over a five-year period.[18] In practice, however, this target can be exceeded when high-deploy-

[18]More precisely, the rules are that a sailor should spend (1) less than 180 days away in a given deployment; (2) less than 50 percent of time away from home port when averaged over the last two and next three years; and (3) at least twice as much time at home as the last deployment before next deployment.

ment requirements are combined with legislated limits on Navy personnel end-strengths.[19]

In addition to the numbered fleets in the table, LANTFLT and PACFLT are also served (respectively) by the Commander, Submarine Force, Atlantic (COMSUBLANT) and the Commander, Submarine Force, Pacific (COMSUBPAC). Their duties parallel those of the numbered surface fleet commanders in the operational chain of command.

As Figure 2.3 shows, naval operating forces below the operating fleet form *task forces* (TFs), forces that may be created from carrier battle groups (see below) and other ships to perform selected crisis-management or presence missions. Task forces are task-oriented and situationally tailored. Historically, membership in and composition of task forces have varied. In the past, task forces were usually disbanded when their missions were completed. Under the reorganization, however, ships and other resources have become permanently associated with a particular task force to create a more stable pool of resources for task-force reconstitution. Task forces are designated by two-digit numbers; for example, task forces in the Second Fleet might be designated as follows: TF 20—battle force; TF 21—amphibious force; TF 23—service force; etc. Figure 2.3 uses an example from CINCLANTFLT to show that task forces are further subdivided into task groups (TGs), task units (TUs), and task elements (TEs). In TF 20, for example, the carrier striking group might be designated TG 20.2, its destroyer screen might be TU 20.2.2, and the TU's anti-submarine search element might be TE 20.2.2.1. Commanders of individual ships, aircraft, and submarines would be found below the task elements.

Task groups also are task-oriented and situationally tailored. Like task forces, under the recent reorganization they also will draw resources from a more stable and identifiable pool of permanently

[19]Fleet operational tempo is specified in the Flying Hour Program (for aircraft) and in terms of ship steaming days per quarter. Planned ship steaming days per quarter for fiscal year 1994 (FY 94) are 50.5 for deployed ships and 29 for nondeployed ships. Department of the Navy, Office of the Comptroller, "FY 1995 Budget Overview," undated briefing.

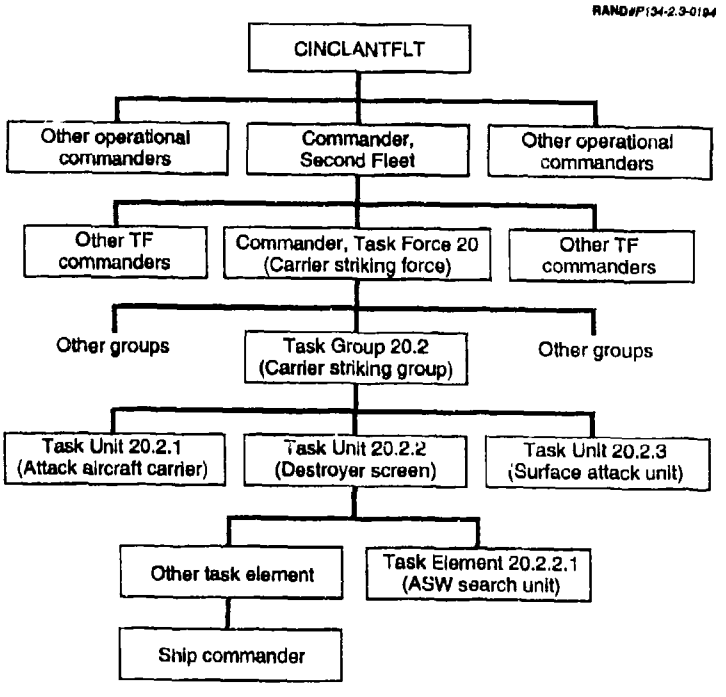


Figure 2.3—Operational Chain of Command Within Atlantic Fleet

associated ships. Several task-group types are especially noteworthy since they represent notional "building blocks" for naval force structure:

- A *carrier battle group* (CVBG) consists of an aircraft carrier and its air wing, and surface combatants and attack submarines that perform screening and other duties, in part to reduce the carrier's vulnerability to enemy attack. A notional carrier battle group might include four anti-aircraft warfare (AAW) cruisers and/or

destroyers, two multimission destroyers with ASW capabilities.[20] In light of the shrinking size of the overall force structure and the diminished threat from former Soviet attack submarines, carrier groups are being downsized.[21]

- A *Surface Action Group* (SAG)[22] consists of a major surface combatant ship and its escorting warships. In the past, this group was often a battleship battle group (BBG), which consisted of an Iowa-class battleship and its associated surface combatants and attack submarines, or was organized around a cruiser or other major combatant.[23] However, with the elimination of the battleship from the Navy's surface fleet, SAGs are now typically organized around Aegis cruisers or destroyers, with associated P-3 Orion aircraft, and other systems.[24]
- An *amphibious readiness group* (ARG) consists of amphibious ships that support a complement of combat Marines for amphibious warfare. It is not unusual to see four or five ships in an ARG, including an amphibious transport dock, a dock landing ship, one or more tank landing ships, and/or an amphibious cargo ship.
- An *underway replenishment group* (URG) typically consists of fleet oilers, fast combat support ships, replenishment oilers, combat store ships, and ammunition ships. It is responsible for providing fuel, provisions, parts, and ammunition to warships.

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[20]United Communications Group (1990). More recently, attack submarines have become optional elements of CVBGs.

[21]Rather than being accompanied by eight to ten cruisers, destroyers, and frigates and two or three support ships, the new carrier battle group might contain only four to six ships, including an Aegis cruiser, a non-Aegis cruiser, one or two destroyers, a pair of frigates, and one or two support ships. Thus, permanently assigned attack submarines may come not to be part of the standard complement of the CVBG. Steigman (1992a).

[22]In 1991, exploration of a new building block began. Called a maritime action group (MAG), it consists of two surface ships, a nuclear attack submarine, and maritime patrol aircraft. See Crawshaw (1993).

[23]A notional BBG included three or more guided-missile cruisers or destroyers, and one or more attack submarines to provide ASW support.

[24]See Crawshaw (1993). SAGs may also include attack submarines.

Navy flying units are part of the same operational chain of command described above. Carrier-based Navy aircraft (and, occasionally, Marine aircraft) are assigned to a carrier task force in squadrons or squadron detachments, in which they are under the operational control of the task force commander.[25]

The Military Sealift Command. *Sealift* refers to a sea-based means of reinforcing ongoing combat operations or military buildup during crisis. It is distinct from *amphibious lift,* which connotes putting troops and equipment ashore against enemy fire and without the use of ports. Sealift typically calls for somewhat developed port facilities and a relatively benign environment for unloading. The Military Sealift Command operates a variety of ships for the DoD, most under charter from commercial firms and the remainder manned by civilian crews.[26] The MSC is a Navy command under an active-duty officer, but the Deputy Commander of the MSC and most MSC Headquarters staff and other personnel are civilians.

Marine Corps Fleet Marine Forces. The Commandant of the Marine Corps is responsible for the readiness and training of the Marine Corps but does not have operational command of combat forces except as specifically assigned by the Secretary of Defense or the Joint Chiefs of Staff. Operational command of the Marine Corps rests with the Fleet Marine Forces within the Atlantic and Pacific Unified Commands. Thus, the Marine Corps' two major operational commands are the Fleet Marine Force, Pacific (FMFPAC), and Fleet Marine Force, Atlantic (FMFLANT). Fleet Marine Forces and their subsidiary elements (such as Marine Expeditionary Forces, described below) are also incorporated into the Navy's operational task-force structure.[27]

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[25]Additionally, at the time of publication, a new concept for Navy–Marine Corps integration called Naval Expeditionary Forces (NEF) was under development. This is expected to create two new joint task organizations—Naval Expeditionary Task Forces (NATFs), for high-demand situations, and Naval Expeditionary Task Groups (NATGs) for lesser situations.

[26]The MSC includes 11 Afloat Prepositioning Ships (carrying ordnance, supplies, and fuel for the Army/Air Force, plus one ship carrying a naval field hospital) and 13 Maritime Prepositioning Ships (MPS) in three squadrons (based in Guam, Diego Garcia, and the Atlantic), each carrying unit equipment and 30 days of supplies for a brigade-size MEF.

[27]For example, TF-45 is assigned to the Fleet Marine Force in the Atlantic Fleet.

Like the Army, the Marine Corps has divisions, regiments, battalions, etc., and the Fleet Marine Force can roughly be equated with the Army's corps-level organization. A salient difference, however, is that an Army corps is primarily a wartime entity (at which time the corps exercises tactical control over the forces assigned to it), whereas Fleet Marine Forces deploy around the world throughout the year. *Hence, the FMF is an administrative as well as an operational entity, making it an important unit of analysis for peacetime resourcing.*

Within an FMF, the generic operational combat element is the Marine Air-Ground Task Force (MAGTF). MAGTFs are formed by combining elements from Marine divisions, Marine Air Wings (MAWs), and other organizations, including assets of the Marine Corps Reserve.

All MAGTFs have the same basic structure, as portrayed in Figure 2.4.[28] The command element (CE) provides command and control. It is composed of the commander, his staff, and a surveillance, reconnaissance, and intelligence group (SRIG), or SRIG detachment.[29] The ground combat element (GCE) is composed of an infantry unit varying in size from a reinforced infantry battalion of approximately 1,400 Marines to one or more divisions of nearly 20,000

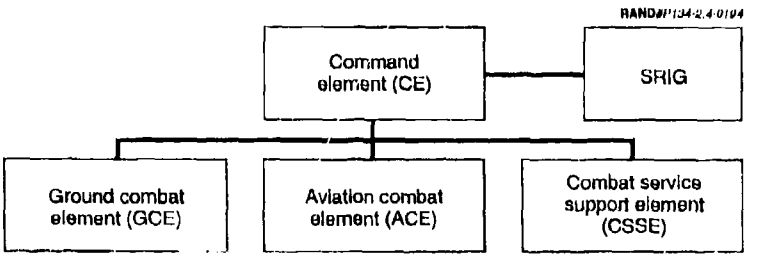

Figure 2.4—Marine Air-Ground Task Force Structure

[28]When required, a MAGTF may also be augmented by naval construction forces (NCF), often called "Seabees" (for naval construction battalion [CB]).

[29]SRIGs reportedly are being phased out.

Marines; the GCE has its own combat support units and organic combat service support capability. The aviation combat element (ACE) varies in size from a reinforced helicopter squadron to one or more MAWs--and also has its own combat support and combat service support units. Finally, the combat service support element (CSSE) includes supply, maintenance, transportation, general engineering, health, and other services capable of supporting the entire MAGTF.

Within the basic structure, MAGTFs—Marine Expeditionary Forces and Marine Expeditionary Units (MEUs)—differ in size and capability.[30] Moreover, sizes of individual MEFs and MEUs can vary greatly.[31] The need to coordinate resourcing for MEFs (and until recently, MEBs) has made them semipermanent fixtures in the Marine Corps force structure, even though MAGTFs in general were conceived as task-oriented organizations that would be disbanded following specific missions.

The largest MAGTF configuration is the Marine Expeditionary Force, which has a Marine Division as its principal ground combat element and is designed to introduce significant combat capability into a theater. There are three MEFs: I MEF (based in California) and III MEF (forward-based in Okinawa and Japan) provide forces to FMFPAC; II MEF provides forces to FMFLANT and is located at bases in North and South Carolina.

Until recently, a Marine Expeditionary Brigade included a regimental landing team and was the smallest MAGTF with forcible-entry

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[30]For example, an MEU would generally deploy without any Hawk (missile) launchers, a brigade-size MEF would deploy with 15, and a MEF would have 75; similarly, a MEU would require just four to six amphibious ships, a brigade-size MEF would require 21 to 26, and a MEF would require 50 or more.

[31]For example, two MEBs that fought in the recent Gulf War--the 4th MEB and the 7th MEB—numbered 8,000 and nearly 17,000 troops, respectively. See Simmons (1991).

capability.[32] MEBs have been supplanted by brigade-size MEFs. Two types of brigade-size MEF—the Maritime Prepositioning Force (MPF) and the Norway Air-Landed MEB (NALM)—are noteworthy because they illustrate the importance of coordinating resources across and within services in support of Marine Corps operations:[33]

- The MPF is a brigade-size Marine Expeditionary Force supported by a Maritime Prepositioning Squadron (MPS)[34] of specially designed merchant ships that can reach anticipated global hotspots in seven days.[35] When directed, the MPS moves to a designated port or beach area, MEF and naval personnel are airlifted to nearby airfields, and the MEF's aviation combat element flies to the area of employment. At the arrival and assembly area, the MEF is married with its equipment.
- The Norway Air-Landed MEB was the result of a DoD-directed program based on a memorandum of understanding between Norway and the United States. This MEB was to be deployed in Air Force–managed Military Airlift Command (MAC) planes to reinforce the North Atlantic Treaty Organization's (NATO) northern flank. It was to be married with prepositioned equipment in Norway.[36]

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[32] MEBs are currently being phased out. Brigade-size MEFs will be used, and the permanent MEF Headquarters will provide the command element. See Polmar (1993). Nevertheless, relatively recent DoD and internal DON documents refer interchangeably to MEBs and "brigade-size MEFs." See, for example, Aspin (1993), pp. 10, 11, 13.

[33] Three other basic forms of MEBs were the amphibious MEB; the Airlifted Contingency Force (ACF) MEB; and the special-operations-capable MEB, the MEB(SOC).

[34] United Communications Group Periscope Database.

[35] The first Maritime Prepositioning Squadron, consisting of four ships, has been deployed since April 1985 and currently is sailing in the eastern Atlantic; the 6th MEB was its command element. The second squadron, consisting of five ships, was deployed in September 1985 and is homeported in Diego Garcia; it was under the command of the 7th MEB. The third squadron, homeported at Guam/Tinian and consisting of four ships, completed loading out in fall 1986 and is deployed in the western Pacific under the command of the 1st MEB. The 1st MEB is scheduled to be the last MEB to be disestablished. Command responsibilities have shifted to the relevant MEFs.

[36] The status of the NALM—whether it has become a brigade-size MEF or has been disestablished—is unclear.

A Marine Expeditionary Unit includes a battalion landing team, and is a still-smaller organization for security and special operations, amphibious raids, noncombatant evacuation, civic actions, and reinforcement or humanitarian assistance. As of 1993, there were seven MEUs: I MEF has three (the 11th, 13th, and 15th MEUs) at Camp Pendleton, California; II MEF also has three (the 22nd, 24th, and 25th MEUs) at Camp Lejeune, North Carolina; and III MEF has one MEU (the 31st) forward-based in Okinawa.[37]

The Marine Security Force. Marine security forces are not part of FMFs but are assigned to various commands throughout the world. Of the three Marine Security Guard (MSG) battalions,[38] one is assigned to the Atlantic Fleet and is headquartered at Norfolk, Virginia, and another is assigned to the Pacific Fleet and is headquartered at Mare Island, California. The third is headquartered at Quantico, Virginia, and provides detachments to the Department of State for the security of U.S. embassies, legations, and consulates, and to the White House for presidential support.

The requirement for fleet-support security depends on the size and composition of the naval fleet. At present, detachments of 45 or 70 personnel (depending on the mission and size of ship) provide special weapons support and ship security functions on Navy vessels. At any given time, there might be detachments on 30 deployed ships as well as 15 ships in port.

Administrative Chain of Command

The DON's administrative organization functions continuously in peacetime and is responsible for the training and material readiness of naval operational forces. The administrative chain of command runs from the President to the Secretary of Defense, and through the

[37]Additionally, there is a unit called a Special Purpose Marine Air-Ground Task Force (SPMAGTF), typically smaller than an MEU. An SPMAGTF's required manning and sustainability are determined on a case-by-case basis, according to mission. MEFs are designed to be self-supporting for up to 60 days of operations, and MEUs are generally designed for 15 days of operation before replenishment. See U.S. Marine Corps (1993), p. 108.

[38]In addition to the three MSG battalions, there are also about 90 security training-cadre teams.

Secretary of the Navy to the Chief of Naval Operations (for the Navy) and the Commandant of the Marine Corps (for the Marine Corps). The chain of command then runs to the naval component commanders; below naval component commander, authority passes to separate Navy and Marine Corps commands, as described below.

The Navy's Administrative Organization. Figure 2.5 portrays the Navy's administrative command structure. Subordinate to the CINCLANTFLT (and CINCPACFLT) is a type commander (TYCOM) for surface forces, as well as one for naval air forces and for subma-

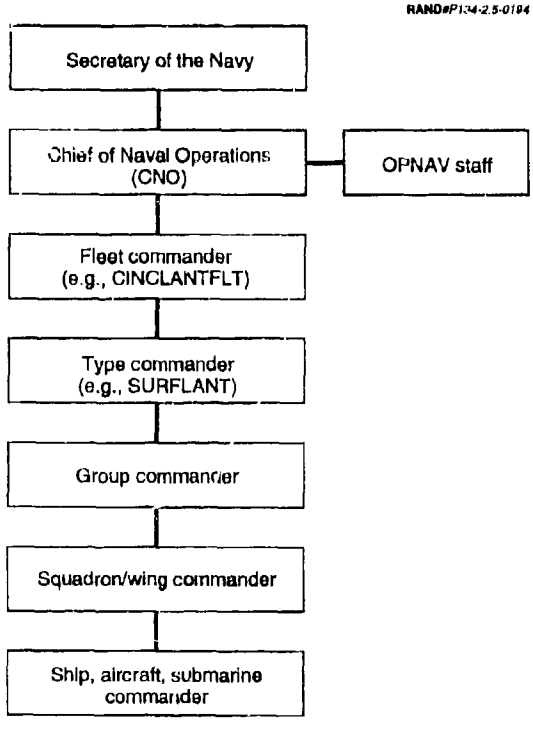

Figure 2.5—Administrative Command Structure of U.S. Navy

rine forces (not shown).[39] Under these TYCOMs in the administrative structure are groups, squadrons, and ships.

To better support its operational chain of command, the Navy recently realigned its administrative organization by strengthening the roles of the fleet commander and battle group commander within the administrative command structure and reducing the responsibilities of the TYCOMs. As was discussed in the preceding section, groups have acquired a more permanent—and less task-oriented—status. Furthermore, under the new structure, the commander of a group (e.g., carrier [CARGRU] or cruiser-destroyer group [CRUDESGRU]) now administratively "owns" the ships (i.e., has authority over them at all times except when under the authority of TYCOM for repair, replenishment, etc.), aircraft, and other resources in the group, and reports to the TYCOM for support only.[40] Other highlights of this realignment for the Atlantic Fleet (similar changes are occurring in the Pacific Fleet) include the following:

- Responsibility for basic shipboard training was taken from the TYCOMs and consolidated in two Afloat Training Organizations (ATOs), one for the Atlantic Fleet (headed by Commander, Training, Atlantic Fleet) and one for the Pacific Fleet.[41]
- The Commander, Second Fleet, was given increased responsibilities for tactical training and readiness, and LANTFLT tactical commanders were placed under his command.[42] Second Fleet also serves as the training fleet for the Sixth Fleet.

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[39]Fleet Marine Forces also serve as type commands but will be discussed later in this section. The two Naval Surface Force type commands are NAVSURFLANT and NAVSURFPAC; the corresponding commands for naval air are NAVAIRLANT and NAVAIRPAC; and the corresponding submarine force commands are COMSUBLANT and COMSUBPAC. The Naval Reserve Force also has type commands. For example, COMNAVAIRRESFOR commands the air type command, and COMNAVSURFRESFOR commands the surface type command of the naval reserves.

[40]In the past, the TYCOMs "owned" the ships and aircraft in the groups; that is, they had administrative authority over them at all times.

[41]As of October 1992, TYCOMs had not yet been downgraded, but such downgrading was seen as a likely consequence of the reorganization.

[42]Commander, Second Fleet, does more than serve as head of the training fleet; his area of responsibility includes the Arctic to the Falkland Islands, and from Norfolk, Virginia, to Rota, Spain.

- Permanent carrier, cruiser-destroyer, and amphibious task groups were formed and were made directly responsible for advanced tactical training of assigned forces.
- Carrier, cruiser-destroyer, and amphibious group commanders now report directly to Commander, Second Fleet, with additional duty to both surface and air TYCOMs; submarine group commanders will continue reporting to COMSUBLANT.
- Readiness squadron (READRON)[43] and submarine squadron commanders are now responsible for maintenance and unit-level training for assigned forces.
- Functional air wings were to be disestablished to eliminate one staff layer, leaving 10 LANTFLT type wings, each reporting to COMNAVAIRLANT and responsible for maintenance and basic training support.[44]

Below TYCOMs, the distinction between operational and administrative command becomes somewhat blurred, especially at sea, and existing command links and staffs may be called upon to simultaneously handle operational and administrative matters. Thus, groups, such as CARGRUs and CRUDESGRUs and their subsidiary elements may be said to be part of the administrative structure, just as task groups are part of the operational structure.

Groups are further broken down into ship squadrons (e.g., destroyer squadrons, amphibious squadrons, mine squadrons) and air wings (e.g., fighter wings, light attack wings, helicopter wings, patrol wings). Although submarines also run in squadrons, in the past they

[43]Amphibious readiness squadrons are known as PHIBRONs.

[44]Similarly, in the past, the next *operational* link below the naval component command was the operational fleet, and the corresponding *administrative* link was a type command that had greater responsibilities for training, maintenance, and other activities. Type commands subdivided the force into categories of ships and aircraft to facilitate training, overhaul and repair, logistics, and other factors that affected readiness. Type commanders supplied ships and aircraft to operational fleet commanders, and had direct responsibility for ships or aircraft that were in home port, in overhaul, or otherwise were not under operational command. For example, TYCOMs were responsible for fleet readiness squadrons—ships or aircraft whose crews were receiving individual proficiency and initial unit training prior to assignment to deployable units. Notably, naval air force TYCOMs oversaw not only naval air wings but also the carriers on which the wings deployed.

often operated independently of groups (i.e., directly under the fleet commanders) because of the requirement for extended undersea patrol.[45] Air wings include a mix of aircraft and are further subdivided into squadrons that contain like aircraft.[46]

Ship squadrons are, of course, composed of individual ships. For centralized recordkeeping purposes, ship type and hull-number designations are used to identify ships within a particular class.[47] In addition, for Navy personnel-assignment purposes, each ship has a permanent and unique five-digit unit identification code (UIC); the UIC for the USS *Roosevelt* carrier is 03342, for example.

Aircraft in Navy and Marine Corps air wings are individually identified by serial ("tail") number. Classes of aircraft are identified by type/model/series (TMS) codes analogous to the mission/design/series (MDS) codes used by the Air Force. For Navy personnel assignment, air unit UICs refer to the air squadron, wing command element, or USMC air detachment.[48]

Marine Corps Administrative Organization. As Figure 2.6 indicates, the Marine Corps administrative chain of command runs from the commandant to the two Fleet Marine Forces, FMFPAC and FMFLANT, which serve as TYCOMs and are the Marine Corps' only two major commands. Below the FMFs, administrative authority

[45]This requirement has been relaxed, however, in light of the reduced threat posed by former Soviet attack submarines.

[46]A typical Navy air wing might consist of two squadrons with 20 F-14s, three fighter/ground attack squadrons (two with 20 F/A-18As, and one with ten A-6Es), two ASW squadrons (one with six S-3B aircraft, and one with SH-3H helicopters), one electronic countermeasures (ECM) squadron (with four EA-6Bs), one airborne early warning (AEW) squadron (with four E-2Cs), and four KA-6D tankers, for a total of 68 fixed-wing aircraft. International Institute for Strategic Studies (1993).

[47]For example, the lead ship of the Los Angeles–class attack submarine is designated SSN 688.

[48]The Appendix of this report provides additional information on the number of ships and aircraft in Navy inventories, and on labeling conventions for various categories of ships and aircraft.

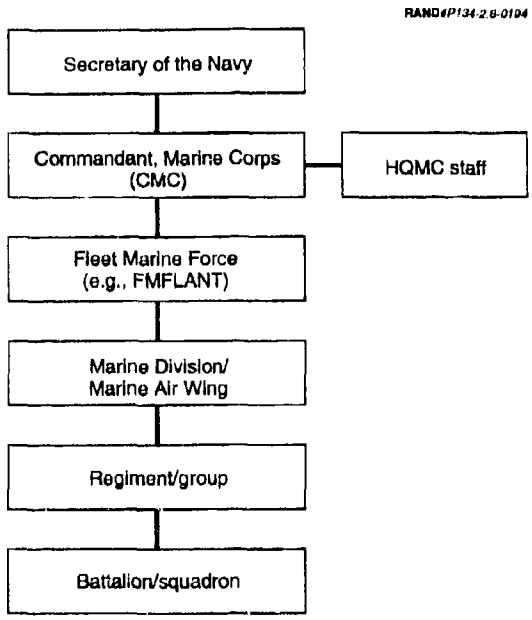

Figure 2.6—Marine Administrative Chain of Command

passes to the Marine Division and Marine Air Wing commanders.[49] Regiments and battalions are below the MarDiv, whereas groups and squadrons are below the MAW.

The Marine Corps is unique among the military services in that the minimum number of divisions and air wings is specified by law. The National Security Act of 1947 (as amended in 1952) and Title 10, *U.S. Code*, which state, in part, that the Marine Corps shall be organized to include

[49]In addition, headquarters of the MAGTFs (MEFs, MEUs, and, until recently, MEBs) have become permanent elements in the administrative structure and report to FMFs.

> not less than three combat divisions, three air wings, and such other land combat, aviation, and other services as may be organic therein. . . .[50]

Marine Divisions have a uniform, "triangular" organization: Each division includes three infantry regiments, each regiment has three infantry battalions, and each infantry battalion has three rifle companies.[51] In addition, a division includes one artillery regiment and a force service support group (FSSG). An FSSG provides combat service support in peacetime as well as in wartime.[52] It includes a headquarters and support (H&S) battalion; a supply battalion; a maintenance battalion; an engineering support battalion; a military transportation battalion; a landing support battalion; a medical battalion; and a dental battalion.

Despite the uniformity of organizational structure, MarDiv resourcing varies over time and among subunits. Because of limitations on personnel end-strength, some active-component force elements may not be fully manned in peacetime. Units with reduced or no manning and equipment in storage are known as "cadre units." In 1990, they comprised three infantry battalions and some service support units. Notably, Marine Divisions are not manned entirely by members of the Marine Corps. In particular, medical and dental corpsmen and certain other specialties are supplied by the Navy. At present, an active Marine Division of about 19,500 troops normally includes approximately 900 members of the active Navy.

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[50]They also specify that the Marine Corps will provide the FMF with combined arms for service with the fleet (specifically, in the seizure or defense of advanced naval bases, and in the conduct of required land operations essential to naval campaigns); develop, in coordination with the Army, Navy, and Air Force, the necessary doctrines, tactics, techniques, and equipment that are to be employed by landing forces in amphibious positions; and perform other duties as the President directs.

[51]The division structure seems likely to change. It may consist of a combined-arms regiment (including a light armored reconnaissance company, a tank battalion, and two light armored infantry battalions), two infantry regiments (each consisting of a reconnaissance company and three infantry battalions), an artillery regiment (including three direct support battalions), and command and support elements (including an anti-aircraft battalion, a combat engineer battalion, and a light armored reconnaissance battalion). See Polmar (1993).

[52]In wartime, units from an FSSG are used to construct the combat service support elements in the Marine Corps operational force structure.

As in Navy aviation, the Marine Corps combines squadrons of like aircraft to form wings with a variety of aircraft (fighter, attack, reconnaissance, transport, and rotary wing). However, air wing structure differs between the two services; for example, a typical Marine Corps Air Wing has 148 fixed-wing aircraft and 152 helicopters[53] and Marine attack squadrons consist of 18 planes that may be deployed in smaller detachments, rather than the Navy's four- or five-plane squadrons.[54]

Marine battalions and squadrons, and their higher echelon command organizations, are identified in Marine Corps data sources by T/O (table of organization) number, which also serves as a unit identification code. Associated with each T/O number is a statement of manning requirements for the unit. There are both notional T/O requirements for various generic types of units and specific T/Os for individual, actual units. Information on the equipment requirements for actual units appears in separate tables of equipment (T/Es).

Reserve Components

In all the services, reserve forces comprise several classifications of personnel. The ready reserve is the broadest classification, including all personnel who can be called to active duty in wartime or national emergency. Ready reserves, in turn, consist of selected reserves (SELRES) and individual ready reserves (IRRs). Selected reserves are paid and assigned to units. IRRs, who are previously trained individuals with time remaining on their initial active-component service obligation (or other commitment), voluntarily participate in reserve

[53]Limited by law to three air wings, Marine Air Wings are made very large. According to International Institute for Strategetic Studies (1993), a notional Marine Air Wing consists of 48 FA-18s, ten A-6s, 60 AV-8Bs, six EA-6Bs, 12 OV-10s, 12 KC-130s, 60 CH-46s, 44 CH-53s, 24AH-1s, and 24 UH-1s. A-6E squadrons, however, reportedly have been phased out of Marine Aviation.

[54]Marine AV-8B squadrons, consisting of 20 aircraft, may be deployed in smaller detachments. Similarly, Marine F/A-18 squadron detachments of 12 may often be deployed. It appears that Marine squadrons trained in carrier operations may be more frequently deployed in carrier wings—a Marine squadron recently deployed to the USS *Roosevelt*, for example.

training, with or without pay, and are not specifically assigned to units.

Selected reserves consist of drill reserves, who do 48 drills (each paid at a full day's rate) plus two weeks of active-training (AT) duty per year, and reserves on full-time active duty. In other services, certain drill reserves are also civil servants employed by the same service and known as military technicians (miltechs); however, neither the Naval Reserve nor Marine Corps Reserve has miltechs.

The following discussion describes how the Naval and Marine Corps Reserves employ the various classifications of reserve personnel.

Naval Reserve. Under the CNO, the Naval Reserve is headed by a rear admiral who holds the positions of Director of Naval Reserve (DIRNAVRES) and Commander, Naval Reserve Force (COMNAVRESFOR), and the title of Chief of Naval Reserves (CNAVRES). Three subordinate commands in New Orleans—Naval Reserve Surface Force Command, Naval Air Reserve Force Command, and Naval Reserve Recruiting Command—function as TYCOMs in Naval Reserve administration.

If called to active duty, nearly 260,000 ready reserve personnel (circa 1991[55]) could expand Navy personnel strength by more than one-third. With fewer than 110,000 IRRs, the majority (around 150,000) of the ready reserves are selected reserves who are paid and engage in regular training.[56] Moreover, most selected reserves have previous military experience; in FY 87, for example, nearly all officer accessions were prior-service (PS) personnel; in FY 91, close to 73 percent of enlisted accessions were PS personnel.

About 21,000 selected reserves are on full-time active duty during peacetime under the Training and Administration of Reserves (TAR) program. This is the Navy's version of the Active Guard/Reserve (AGR) program, differing primarily in that TAR personnel deploy just as active-component personnel do. TARs are used in occupations

[55]The figures cited in this and the next paragraph derive primarily from Reserve Forces Policy Board (1992).

[56]Reserve drill and AT occur at approximately 225 reserve centers that are operated by the Navy or, increasingly, at active Navy commands and in active units' mobilization billets.

that require sufficient numbers and grades of military personnel to support a military career,[57] and have been used in shipboard positions only for the past few years. In the Navy, the acronym SELRES specifically refers to those selected reservists who are on paid drill status—i.e., excluding TARs.

In FY 91, the Naval Reserve's full-time workforce included about 8,900 military personnel from the active Navy and about 3,000 civil servants in addition to about 23,000 TARs. The Naval Reserve's ratio of full-time personnel to total selected reserves has been about 1:5, a bit higher than the 1:6 average for all DoD.

Selected reserve personnel may be assigned to three types of units: (1) commissioned units, (2) reinforcing units, and (3) sustaining units, as follows:[58]

- *Commissioned units* are units with organic equipment—such as aircraft squadrons or construction battalions—tasked to deliver a complete operational entity to the operating force. Commissioned units accounted for only 6.2 percent of the more than 3,000 Naval Reserve units in 1987.
- *Reinforcing units* augment active Navy commissioned units and operating staffs (and some Marine Corps combat commands) with trained personnel; major equipment items are owned by the active-component units to be reinforced. In 1987, reinforcing units constituted 28 percent of reserve units.
- *Sustaining units* augment fleet and force support activities. In 1987, 65.8 percent of reserve units were sustaining units.

Measures of reserve contributions to the total force in any service are difficult to develop and interpret. However, like the distributions of Naval Reserves among types of units listed above, the indicators in Table 2.2 also suggest that the main role of the Naval Reserve is to reinforce and sustain activities.

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[57]For example, there are no TAR boiler-tenders because that occupation lacks a sufficient hierarchy of grade requirements to support a full career of regular promotions.

[58]SELRES personnel are assigned to the submarine program but serve at shore facilities, not on submarines.

Table 2.2

Naval Reserve Contributions to the Total Navy, September 1991

Reserve Contribution	Reserve Percentage of Total[a]
Fighter composite/service squadrons (U.S. based)	100
Logistics aircraft squadrons (U.S. based)	100
Mobile inshore undersea warfare units	100
Naval embarked advisory teams (NEATs)	100
Strike rescue/special warfare support helicopter squadrons	100
Naval control of shipping (military personnel)	99
Cargo handling battalions	93
Military Sealift Command (military personnel)	84
Mobile construction battalions	68
Intelligence program personnel	60
Mobile diving and salvage units	60
Ocean minesweepers	59
Mobile mine assembly groups	48
Fleet hospitals	47
Airborne mine countermeasures	40
Special boat units	40
Maritime air patrol squadrons	39
Frigates (FFG-7s/FF-1052s)	36
LAMPS MK-1 antisubmarine warfare squadrons	33
Explosive ordnance disposal units	32
Naval special warfare units	28
Carrier air wings	14
Amphibious warfare ships	8

SOURCE: Reserve Forces Policy Board (1992), p. 18. Data as of September 30, 1991.

[a]Percentages are determined by counting like-type units or personnel.

Based on initiatives undertaken by former Secretary of the Navy Lehman, the Naval Reserve today operates under the concept of "horizontal integration," which means that the reserves use the same types of equipment, particularly ships and aircraft, as active-component units performing the same missions.

The Naval Reserve grew rapidly in the 1980s with the introduction of modern frigates, new mine countermeasure ships, and F/A-18, P-3C, and F-14 aircraft. Naval Reserve Force (NRF) ships belong to the active-component Navy and are in the chain of command of the CINCLANTFLT and CINCPACFLT. The NRF is responsible for about two-thirds of the Navy's small patrol craft.

NRF ships are manned by a reduced number of full-time personnel (i.e., at levels lower than normal peacetime levels for these types of ships in the active component) and, in addition to the normal mission for the ship, are assigned a mission to train Naval Reservists. Full-time personnel assigned to NRF ships are provided by the active component and the TAR program. The percentage of ship manning provided by full-time personnel varied in 1987 from 57 percent for antisubmarine warfare to 69 percent for ocean minesweepers.

In 1992, the NRF typically had a total of 52 squadrons, organized into two carrier air wings, 13 maritime patrol squadrons, and several additional support and transport squadrons.[59] Reserve pilots are assigned to reserve air stations or reserve units at active stations. There are approximately 23 reserve air centers, most located at naval air stations.

Marine Corps Reserve. The HQMC office with principal responsibility for the Marine Corps Reserve is the Office of the Deputy Chief of Staff (DCS) for Manpower and Reserve Affairs (M&RA). The Assistant DCS for Reserve Affairs is directly responsible for Marine Corps Reserve operations, readiness, planning, and budget.

As we noted above, measures indicating a reserve component's contribution to a service's total force structure are difficult to define and interpret. However, a crude indication of the Marine Corps Reserve's contribution is provided by Table 2.3. Overall, the Marine Corps Reserve is organized to provide about one-quarter of the wartime Fleet Marine Force structure. Aside from providing augmentation for Marine Corps active units, the reserve can field a brigade-size Marine Expeditionary Force, but with reduced aviation and limited combat service support.

The Marine Corps Ready Reserve is more evenly balanced between selected reserve and IRR personnel than the Naval Reserve. With close to 44,000 members in recent years, the Selected Marine Corps Reserve (SMCR) is organized into units located principally in the 4th Marine Division, the 4th Marine Air Wing, and the 4th Force Service

[59]We are indebted to RAND Navy Fellow CDR Tom Parker for pointing out that the number of squadrons in the NRF changes routinely.

Table 2.3

Marine Corps Reserve Contributions to the Total Marine Corps, September 1991

Unit or Aircraft Type[a]	Reserve Percentage of Total
Unit Type	
Civil affairs groups	100
Force reconnaissance companies	50
Air/naval gunfire liaison companies (ANGLICO)	50
Tank battalions	40
Infantry regiments	27
Light anti-aircraft missile batteries	25
Low-altitude air defense	25
Engineer support battalions	25
Landing support battalions	25
Artillery regiments	25
Aircraft Types[b]	
Adversary aircraft	100
Aerial refueling aircraft	33
Observation aircraft[c]	31
Electronic warfare aircraft[d]	25
Light attack aircraft	22
Helicopters	14
Fighter aircraft	12

SOURCE: Reserve Forces Policy Board (1992). Data as of September 30, 1991.

[a]Percentages determined by counting like-type units.

[b]Percentages determined by counting primary authorized aircraft.

[c]VMOs (squadrons of observation aircraft) reportedly are being decommissioned.

[d]EW aircraft reportedly have been reassigned to active-duty Marine Aviation.

Support Group. The IRR, which stood at about 50,000 in FY 91, is expected to grow substantially during the early 1990s because the initial military obligation of Marines recently increased from six to eight years without a corresponding increase in the initial term of active-duty service. IRR growth can be consistent with constrained manpower budgets because IRR personnel can train on a voluntary (unpaid) basis.

In the Marine Corps, SMCR personnel on full-time active duty are known as "military full-time support," or "military FTS." (This def-

inition should not be confused with the general DoD meaning of FTS, which includes active-component and civilian personnel employed in reserve units.) In FY 91, the Marine Corps Reserve's full-time workforce included very few civil servants, no military technicians, over 5,000 active-component military personnel, and 2,300 AGR/TAR military FTS personnel. The ratio of the full-time workforce to SMCR personnel was 1:6, about average for the DoD as a whole.

Prior-service experience is widespread among Marine Corps Selected Reserve accessions, but not as common as in the Naval Reserve. Although all SMCR officer accessions were PS personnel in FY 87, less than half (about 40 percent) of enlisted accessions had prior military experience; by 1991, the proportion had fallen to around 22 percent.

SHORE ESTABLISHMENT

The DON Shore Establishment consists of a combination of centralized organizations (naval major shore commands and HQMC offices) and dispersed shore-based activities. As might be expected, this establishment is undergoing major changes as the Maritime Strategy is replaced with the new strategic concept articulated in . . . *From the Sea*,[60] which emphasizes expeditionary forces. Prior to the 1993 deliberations of the third Base Closure and Realignment Commission, the DON had 154 continental United States (CONUS) installations consisting of ten major operating bases, eight shipyards, 28 naval air stations, and 16 major Marine Corps bases. The DON recommended the closure of an additional 23 installations during the 1993 Base Realignment and Closure (BRAC) round.[61]

As shown in Figure 2.1, centralized organizations under the CNO manage activities that pertain to both the Navy and Marine Corps, whereas offices in the HQMC manage functions that are specific to the Marine Corps. Dispersed shore activities, not shown in Figure 2.1, include submarine bases and Marine air stations, and are specifically "owned" by the Navy or Marine Corps, although they of-

[60]U.S. Department of the Navy (1993).

[61]U.S. Navy, Chief of Naval Operations (1993), p. 25. Additional closures and consolidations are expected.

ten serve tenants from the sister service. The following discussion separately treats the Navy centralized Shore Establishment, the Marine Corps supporting establishment, and dispersed shore activities.

Naval Major Shore Commands

The Navy's major shore commands are typically responsible for a Navy- or area-wide mission and include all subordinate shore facilities required to carry out that mission. Table 2.4 lists the major shore commands (circa 1990), all of which report to the Chief of Naval Operations.

Unlike the Army, which integrates all its materiel management activities under a single major command (the Army Materiel Command), the Navy divides systems management according to type of materiel

Table 2.4

Major Navy Commands of the Shore Establishment[a]

Command Title
Bureau of Naval Personnel (BUPERS)
Bureau of Medicine and Surgery (BUMED)
Chief of Naval Education and Training (CNET)
Naval Telecommunications Command (NAVTELCOM)[b]
Naval Intelligence Command (NAVINTCOM)
Naval Space Command (NAVSPACECOM)
Naval Security Group Command (NAVSECGRU)
Naval Investigative Service Command (NISCOM)
Naval Oceanography Command (NAVOCEANCOM)
Naval Legal Service Command (NAVLEGSVCCOM)
Naval Sea Systems Command (NAVSEA)
Naval Air Systems Command (NAVAIR)
Space and Naval Warfare Systems Command (SPAWAR)
Naval Supply Systems Command (NAVSUP)
Naval Facilities Engineering Command (NAVFAC)

SOURCE: Bearden and Wedertz (1989), pp. 518–521.

[a]Not shown is the newly created Naval Doctrine Command. See U.S. Department of the Navy (1993), p. 12.

[b]NAVTELCOM and Naval Data Automation Command (NAVDAC) consolidated in 1990.

or "platform." The three *systems commands* (SYSCOMs) responsible for developing and providing all nonstrategic[62] combat systems to the operational forces are as follows:[63]

- The Naval Air Systems Command (NAVAIR) manages aircraft, airborne weapon systems, and related equipment for both the Navy and Marine Corps. NAVAIR also operates numerous shore facilities and ranges in support of these platforms.
- The Naval Sea Systems Command (NAVSEA) manages ships, submarines, shipboard combat systems and components, and related systems for both the Navy and Marine Corps. NAVSEA also operates shore facilities for ships, submersibles, and other sea platforms.
- The Space and Naval Warfare Systems Command (SPAWAR) manages space systems; command, control, communications, and intelligence (C^3I); electronic warfare; undersea surveillance; and other specialized electronic equipment for both the Navy and Marine Corps.

Until recently, principally located in Crystal City, Virginia, these systems commands provide for a full range of contract negotiation and management, system development, and support services.[64] These functions are discussed more fully in Chapter Four of this report. Although the full implications are unclear at present, under the recent reorganization the systems commands are expected to lose billets and will consequently need to adapt to lower staffing levels.[65]

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[62]Similarly, the Director, Strategic Systems Programs, provides for the development, production, and materiel support for Fleet Ballistic Missile and strategic weapon systems, including platforms and associated equipment, security, training of personnel, and installation and direction of supporting facilities. In this sense, SSPO is similar to a systems command. See Figure 4.1 to see where SSPO may be found in the organizational structure for Research, Development, and Acquisition (RDA).

[63]However, Program Executive Officers (PEOs) also are responsible for the development of combat systems.

[64]Some SYSCOMs are being moved to reduce costs: NAVAIR will move to Patuxent, Md.; NAVSEA, to White Oak, Md.; and NAVSUP, to Mechanicsburg, Penn. Additionally, BUPERS is being moved to Memphis, Tenn.

[65]There reportedly is also a distinct possibility of another major reorganization that will affect the systems commands.

Two other shore commands provide materiel support for the operating forces. One is the Naval Facilities Engineering Command (NAVFAC), for shore facilities, real property, utilities, fixed ocean systems and structures, transportation equipment, energy, environmental and natural resources management, and support of naval construction forces. The other is the Naval Supply Systems Command (NAVSUP), for logistics materials, supplies, and support services. NAVFAC and NAVSUP are sometimes described as systems commands because their functions are analogous to those of NAVAIR, NAVSEA, and SPAWAR. Additionally, a Naval Doctrine Command was recently created, sited in Norfolk, Va., and was charged with developing doctrine for joint operations, especially for expeditionary warfare.

Other important resourcing organizations among the major shore commands are the Bureau of Naval Personnel (formerly the Naval Military Personnel Command), the Director, Training and Doctrine (formerly Chief of Naval Education and Training), and the Bureau of Medicine and Surgery. The first two are responsible for developing programs for the acquisition, maintenance, development, and distribution of military personnel resources throughout the Navy; the third manages medical and dental resources used by the Marine Corps as well as the Navy.

Marine Corps Supporting Establishment

The Marine Corps supporting establishment recruits and trains Marines, provides supply and equipment support to Marine Corps operating forces, and maintains permanent Marine bases, installations, and formal schools.[66] The following support establishment organizations are especially noteworthy in the context of cost analysis because of their important roles in Marine Corps resourcing:

- The Marine Corps Systems Command (MARCORSYSCOM)[67] is analogous to the Navy's systems commands, but deals with

[66]U.S. Government Printing Office (1990), p. 236.

[67]Formerly called the Marine Corps Research, Development, and Acquisition Command (MCRDAC), it was renamed MARCORSYSCOM on February 1, 1992, and is located at Quantico, Va.

Marine Corps–specific materiel, primarily ground equipment (e.g., tanks), light weapons and equipment, and ammunition. MARCORSYSCOM also oversees Marine Corps applications of major items of equipment, such as tracked vehicles, that are purchased in conjunction with the Army.

- The Office of the Deputy Chief of Staff for Installations and Logistics (I&L), as its name implies, combines oversight of facilities and transportation management and logistics support (maintenance parts and services).
- The Office of the DCS for Manpower and Reserve Affairs (M&RA) manages the Marine Corps Reserve, evaluates issues concerning the functional uses of manpower, and oversees human resource programs such as Morale, Welfare, and Recreation. M&RA includes a Personnel Management Division that oversees personnel assignment policy, and a Manpower Management Information Systems Division that is responsible for troop strength data.
- The Office of the DCS for Plans, Policies, and Operations (PP&O) addresses joint planning issues and warfighting requirements in terms of FMF and non-FMF force structure.
- The Office of the DCS for Requirements and Programs (RP) evaluates resourcing requirements and coordinates the development of the Marine Corps programs for the DON *Program Objective Memorandum* (see Chapter Three).
- The Fiscal Directorate (FDMC) prepares Marine Corps input to the DON budget and has, at times, been the collector and publisher of Marine Corps cost factors.[68]

Another supporting-establishment element that influences resourcing activities is the Marine Corps Combat Development Command (MCCDC). Analogous in many respects to the Army's Training and Doctrine Command (TRADOC), it is responsible for the development and promulgation of doctrine; identification and assessment of changes to doctrine, training, MAGTF force structure, and materiel; and execution of the Marine Corps Studies Program. MCCDC is also the central proponent for FMF acquisitions and force structure, and

[68]See, for example, U.S. Marine Corps (1988).

plays key roles in the decision processes described in Chapters Three and Four.

Dispersed Shore Activities

As of late 1990, there were nearly 200 dispersed DON shore activities, including naval bases, naval surface weapons centers, submarine bases, amphibious bases, air facilities and stations, reserve training units, ammunition depots, communication stations, fleet intelligence centers, fuel depots, naval hospitals, laboratories, medical centers, recruiting stations, shipyards, aircraft rework facilities, supply centers, schools, and one-of-a-kind activities such as the Naval Academy and Naval Observatory.[69] Such activities are managed by a fleet command, a systems command, or other major shore command.

Some activities are financed through the Navy Industrial Fund (NIF) or the Navy Stock Fund (NSF). Shipyards (where ships are overhauled and repaired) and aircraft rework facilities are industrially funded; they bill commands for reimbursement of costs, including overhead. Repair parts and components are stock-funded items, and using commands are billed for item costs, including supply-system overhead.

Other activities are funded by the commands that operate them but are reimbursed for services provided to other commands. For example, ships are assigned to a specific home port but may be stationed at a different base, for which the base command is reimbursed.

A *complex* is a major site consisting of multiple activities. As of 1991, there were 75 complexes in CONUS, three in Europe, and 25 in the

[69]See Table A.2 in the Appendix for a listing of major shore activities by type. The several rounds of the Base Realignment and Closure Commission have resulted in recommendations for a number of base realignments and closures. The Navy is also moving to consolidate activities to six major ports (three on each coast), which will serve as the nucleii for operational forces: On the East Coast, two major ports (Norfolk, Va., and Mayport, Fla.) and a dedicated submarine base at King's Bay, Ga., will serve to consolidate DON operations; on the West Coast, San Diego, Calif., Pearl Harbor, Hawaii, and a cluster of bases in the Seattle, Wash., area will be used to streamline operations. See Ward (1993).

Pacific. Figure 2.7 shows the locations of the 20 home port complexes in the United States as of 1991.

One of these complexes—Camp Pendleton—houses a Marine Corps base and air station. That complex, along with another 13 principal Marine Corps activities, hosts FMF tenants. These principal activities are listed in Table 2.5.

HIGHLIGHTS FOR THE COST ANALYST

Several features of the DON's organizational structure have implications for cost analyses. These features might be grouped under the following headings:

- Integration of forces and functions
- Variability in units of analysis
- Peacetime operational responsibilities
- Operating and support sensitivity to force and operating decisions.

Integration of Forces and Functions

In the executive structure, some decisions and policies are established jointly for the Navy and Marine Corps, whereas others are service-specific. Consequently, some costing data sources (e.g., for aircraft operating programs) are centralized for the DON as a whole, and others (e.g., for facilities) are managed at separate locations for the Navy and Marine Corps. The distribution of decisionmaking activities will be discussed more fully in Chapter Three.

With regard to operating forces, this chapter has emphasized not only that the DON has a varied portfolio of activities and platforms, but that those activities and platforms must be carefully coordinated and integrated for peacetime and potential wartime operations. Navy and Marine Corps forces operate in concert, with Marines providing security for carriers and bases, the Navy providing chaplains and medical and dental personnel, and both services working jointly in amphibious operations. The Naval Reserve is primarily a mobi-

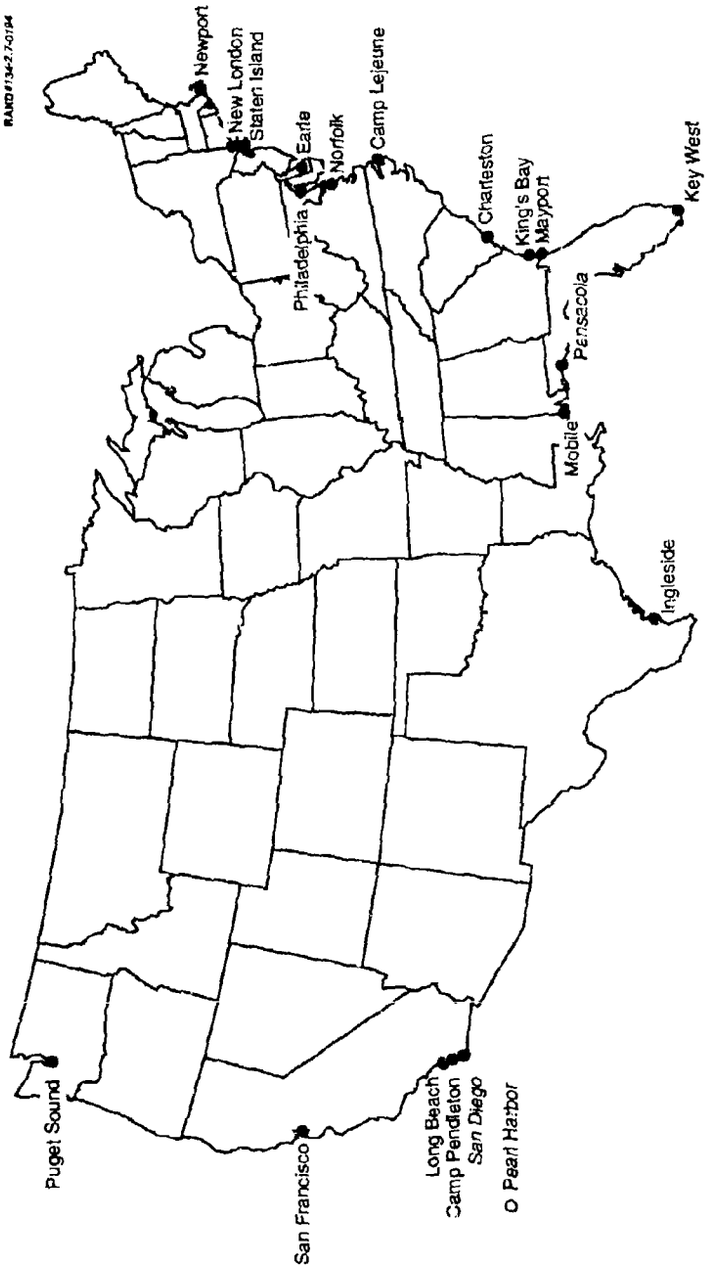

Figure 2.7—U.S. Navy Shore Establishment Home Port Complexes

Table 2.5

Marine Corps Shore Activities with FMF Tenants, 1987

Marine Corps air stations (MCAS)
Cherry Point, N.C.
El Toro, Calif.
Beaufort, S.C.
Yuma, Ariz.
Kaneohe Bay, Hawaii
Iwakuni, Japan
Marine Corps air stations (helicopter)
Futenma, Japan
New River, N.C.
Tustin, Calif.
Bases
Camp Butler, Japan
Camp Lejeune, N.C.
Camp Pendleton, Calif. (also an MCAS)
Camp Smith, Hawaii
Marine Air-Ground Combat Center, Calif.

SOURCE: U.S. Marine Corps (1987).

lization-augmentation force for the active component and therefore has few ships or squadrons that can operate autonomously. The overall implication is that it is often inappropriate to analyze force structure or operational issues with respect to a single DON service or component.

By the same token, costing issues involving dispersed shore activities will often require consideration of their implications for a wide variety of organizations. Since ships require ports in deep-water coastal environments, the Navy's choices of basing sites are more restricted than is true for the Army or Air Force. And, once such a site is developed, coordination of related activities (e.g., Marine Corps security with carrier operations) makes it convenient to colocate those activities. Consequently, a change in basing structure would normally affect both the Navy and Marine Corps, both active and reserve units, and possibly a wide range of functional activities within each service and component.

Variability in Units of Analysis

The DON's operating force structure can be characterized in several different ways: (1) in terms of high-level force aggregates, such as operating fleets or Fleet Marine Forces; (2) in terms of operational command, such as task groups and MEFs; (3) in terms of administrative command, such as TYCOMs or divisions; and (4) in terms of primary force elements, such as ships, battalions, and aircraft squadrons or detachments. Force-structure decisions may be stated in any of these terms, requiring a cost analyst to be able to characterize the manpower and equipment assets and operating levels associated with alternative force-element definitions.

As a practical matter, few of these units of analysis are easily defined in terms of assets and operating levels: Operating commands are reconstituted on task-oriented bases, and administrative commands are not entirely homogeneous within a type. Furthermore, force-structure elements in both the Navy and Marine Corps have changed and will continue to change over time. Earlier, we noted that the phasing out of Navy battleships has entailed the elimination of the battleship surface action group; as in the past, other SAG configurations will continue to be task-configured, often using the cruiser as the key element.[70]

As for the Marine Corps, while it has traditionally been considered a light infantry force, it has developed doctrine for, and has begun obtaining, significantly heavier weapons; for example, the heavy antitank (i.e., TOW) weaponry of a Marine Division has doubled with the addition of a TOW platoon in each infantry regiment headquarters company. Changes such as these imply that force designs can become obsolete and must be updated for accurate costing.

Peacetime Operational Responsibilities

The large portion of Navy and Marine Corps forces that are in deployed status during peacetime has two implications for cost analysis. One is that the distinction between unit training operations and

[70]We are grateful to CDR Tom Parker for pointing out that nonbattleship Surface Action Groups have long been a staple of Navy operations, and that the SAG may consist of as few as one ship or may often involve as many as eight or ten.

peacetime mission operations is ambiguous for the DON. A carrier and its air wing, when deployed to the far Atlantic, are *jointly* engaged in training their crews, establishing a forward presence for contingency response, and making a show of force that can be useful for deterrence. When analyzing DON peacetime operating budgets, analysts should be wary of assuming that funds support only one mission or another; for example, reductions in the perceived need for unit training operations (e.g., owing to a reduction in fleet size) need not imply a reduction in the need for operating budgets to keep ships and aircraft in deployed locations for peacetime-mission purposes.

The other implication of major deployments is that supporting them affects force structure and operations at home. Personnel rotation is far more extensive in the Navy and Marine Corps than in the other services and requires providing suitable CONUS shore billets for returning personnel to occupy. Furthermore, predeployment training and overhaul schedules must be coordinated across platforms that operate in concert. For example, when combined with PERSTEMPO objectives, overhaul schedules imply that an inventory of three or more carriers may be needed to support a full year of carrier deployment at sea. When asked to analyze changes in deployment patterns or forward basing, analysts should be sure to consider whether the proposed changes might have important secondary effects on CONUS-based force structure, maintenance, or other activities.

Operating and Support Sensitivity to Force and Operating Decisions

A significant portion of the Navy's force structure consists of large warships that are costly to operate, are owned in small numbers, and are operated subject to a deployment-and-maintenance cycle that is many months in duration. Moreover, these warships are not operated singly but in groups with other types of ships, and on deployments that vary greatly in the distances that must be traversed and the mix of weapon systems to be used. As a result, the annual operating and support (O&S) cost for a given ship can vary widely over time—and the costs over all ships in a class can vary widely around the average. With some justification, the Navy argues strenuously that average annual O&S cost experience for ships is a

poor predictor of any given year's budget costs, and that specific operating and overhaul schedules should be used instead.[71]

The next chapter describes how resourcing is performed in the context of the DoD-wide Planning, Programming, and Budgeting System.

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[71]This does not necessarily imply that annual operating cost averages are poor measures when comparing alternative weapon system designs. Such comparisons would involve acquisition costs as well as performance, schedule, and other considerations.

Chapter Three

DON PLANNING, PROGRAMMING, AND BUDGETING

The DoD-wide processes and procedures designed to link threat assessments to resource decisions and far-term goals to near-term programs and budgets constitute the Planning, Programming, and Budgeting System (PPBS). This chapter describes how the Navy and Marine Corps conduct PPBS activities. It includes a discussion of recent changes in the internal processes and committee structure used by the OPNAV staff for Navy programming. The chapter concludes with comments on DON costing in the PPBS context.[1]

An example of the particular challenge faced by the Department of the Navy is illustrated by estimates of ships needed for changing force structures. Like the other military departments, the DON is subject to fluctuating force-structure and resourcing levels. In 1980, the Navy force structure consisted of about 500 ships,[2] the result of a decade of shrinkage. Then, during the Reagan Administration, a maritime strategy that emphasized a robust forward defense for deterrence and a rapid shift to combat, including massive naval strikes against the Soviet homeland, called for a 600-ship fleet. About half the transition from 500 to 600 ships, along with associated changes in air wings and Marine Corps force structure, was accomplished by

[1] For those readers familiar with PPBS before the 1992 reorganization, we contrast the old *Program Objective Memorandum* (POM) development process with the new one later in this chapter.

[2] As Chapter Two indicates, the Navy changed its method for counting ships during the 1980s. By the traditional count, the fleet contained 531 ships in 1980. By former Secretary Lehman's method of counting deployable ships, the number was 479. The 452-ship estimate for 1995 is based on Lehman's counting system.

1990. But with the dissolution of the Soviet Union—and the incapacitation of much of the former Soviet fleet—the justification for a 600-ship Navy has evaporated and the DON has downsized its planned force structure. In 1992, DoD estimated a force of 452 deployable ships for FY 95[3] and reduced DON manning (Navy and Marine Corps) by nearly 13 percent from its 1990 level.[4] The Clinton Administration's "Bottom-Up Review" aims for 346 ships by 1999.

Fluctuations like these pose two management challenges:

- To adapt near- and mid-term resourcing patterns to achieve highly variable longer-range goals for force size and structure. This can be a particularly difficult challenge in the DON because ship construction has among the longest lead times of all military acquisitions.
- To maintain balanced forces in the near term, despite sudden and perhaps drastic budget adjustments not anticipated by longer-range PPBS planning.

Such balancing can be especially difficult for the DON because it must be done with forces across platforms (air, ground, surface, and undersea) and between services (Navy and Marines).

GENERAL BACKGROUND

Among the key DoD-wide products of PPBS are (1) the *Joint Strategic Planning Document* (JSPD),[5] a comprehensive military appraisal of the worldwide threat to U.S. interests, including recommended military strategies; (2) *Defense Planning Guidance* (DPG), a broad statement of policy concerning overall force-structure objectives and the military contingencies to be met; (3) related fiscal guidance, which

[3]See Cheney (1992), p. 75.

[4]This estimate is based on active military end-strengths published in *Defense 92* (Department of Defense, 1992b), p. 135, and manpower figures contained in Powell (1992b).

[5]The JSPD is a Joint Staff publication that describes what the services believe they need to accomplish the national strategy, in accordance with *Defense Planning Guidance* and other official statements. The JSPD is classified and receives limited distribution.

sets annual dollar limits on each military department's Total Obligational Authority (TOA);[6] and (4) editions of the *Future Year Defense Plan* (FYDP), an automated database containing the results of force, manpower, and spending decisions. The DON contributes to these and other PPBS products; it maintains its own internal database that supplies FYDP data.

The FYDP is a rolling record of force and resource decisions, and is updated at various stages of each PPBS cycle. Under biennial budgeting, there are three major updates in each two-year period:[7]

- The President's Budget (PB) and FYDP are submitted to Congress in January of odd-numbered calendar years (and even-numbered years when there is a budget amendment). That FYDP covers the prior fiscal year, the current fiscal year, the two fiscal years covered by the PB (the "budget years"), corresponding data for these four years of TOA, manpower, and forces, and an additional three years of force projections.
- In early spring of the following year, each service forwards its *Program Objective Memorandum* and a revised and extended FYDP submission to OSD. While recognizing budget actions taken by Congress since the previous PB, the POMs focus on proposals for the "POM years"—the post-budget years in the prior FYDP plus two additional years. POM submissions are reviewed by OSD, which issues a *Program Decision Memorandum* (PDM) containing program decisions made by the Secretary of Defense.
- The services then convert the first two years of their POMs, as amended by the PDM, into Budget Estimate Submissions (BESs) for the next two-year budget, and, in early fall, the FYDP is updated again. The BESs are reviewed by the Office of Management and Budget as well as OSD, yielding approved alternatives documented in Program Budget Decisions (PBDs) that, in turn, are incorporated in the next President's Budget.

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[6]TOA is the total dollar amount of funds a service is authorized to obligate for purchases of goods and services.

[7]In practice, Congress approves the budget only one year at a time, resulting in "off-year" budget changes. These and other off-schedule adjustments can easily lead to five or six FYDP updates per cycle.

By the time the PBDs are issued, the services have already begun work on their next POM submissions, and the cycle begins again. Underlying this cycle is a complex array of simultaneous and interactive activities, some of which take longer than one PPBS cycle to complete.

Our goal here is to highlight features of DON planning activities, POM development, and budget development and execution that are particularly relevant to cost analysts.[8] A full explanation of the PPBS or even the Department of the Navy's participation in it is well beyond the scope of this report. To set the stage, we begin with a general survey of the overall PPBS within the DON, the key players and their roles in that process, and the DON's central programming database.

PROCESS OVERVIEW

In Figure 3.1, phases of the DON's internal PPBS activities are displayed under those of the DoD-wide process, for comparison. Three features of the overview are noteworthy for our purposes:

- The DON uses a special term, "Program Planning," to refer to its own internal planning phase activities.

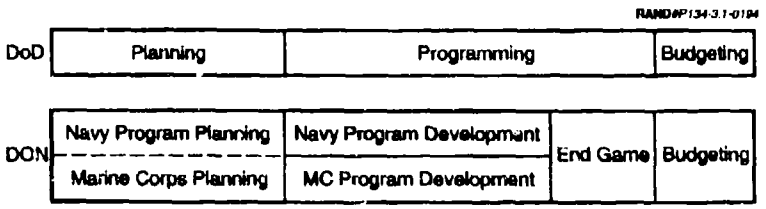


Figure 3.1—PPBS Phases in the DoD and the DON

[8]Additional sources of information about the DON's participation in PPBS can be found in the Bibliography. Also, a DON PPBS Training Course is frequently scheduled by the DON Program Information Center (DONPIC).

- The Navy and Marine Corps proceed on parallel but distinct tracks to develop their portions of the department's POM submission.
- The DON identifies a separate phase of POM and initial budget development, informally known as "End Game," in which final decisions for both services are made.

The PPBS planning phase proceeds on both a DoD-wide level and a service-specific level. The DoD-wide process develops guidance for combined-arms force structure, operations, and resourcing. It is led by the Joint Chiefs of Staff and the Secretary of Defense, with key participation by the CINCs of the unified and specified commands.[9] Meanwhile, service-specific planning aims both to influence combined-arms planning and to translate those plans into guidance for the service's own programs. For example, the Air Force's internal *War and Mobilization Plan* (WMP) provides policy and planning factors in support of the JSPD; *The Army Plan* (TAP) articulates the Army's internal manifestation of the DPG. Similarly, the DON develops relatively detailed internal planning documents related to those developed in the joint arena.

As regards the joint arena, the Navy's process is different from that of the other services. Unlike the other services, the Navy uses distinct terminology for the two levels of planning: combined-arms planning is described as "DoD planning" (the "Planning" phase in the DoD portion of the figure), whereas the corresponding Navy function is "Navy Program Planning." This terminology not only distinguishes between the DON and joint arenas, but highlights the Navy's concern with fiscal constraints and specific program choices from the outset of its planning activities. Indeed, the Navy sometimes describes Program Planning as the first phase of POM preparation.

Another distinguishing feature of the DON participation in PPBS is that the department's overall TOA must be allocated between two services. As described below, some appropriations, such as military personnel, are service-specific; others, such as O&M (operations and

[9]A recent change under the Goldwater-Nichols Act was that the CINCs are now directly involved in the programmatic world; as will be discussed, this change is reflected in the Navy through fleet input to the PPBS process.

maintenance) for aircraft operations, cover both Navy and Marine Corps programs but must be separately allocated for execution. Thus, just as the DoD as a whole coordinates strategies and plans across departments while also allowing each to develop its own programs and budgets within its own fiscal guidance, the DON does the same with respect to the Navy and Marine Corps.

Separation between Navy and Marine Corps PPBS procedures is most evident during the part of the programming phase known as Program Development. During that phase, each service develops its own portions of the DON POM from an explicit split of the department's overall TOA limits between Navy "blue dollars" (the portion of the DON TOA allocated to the Navy) and Marine Corps "green dollars" (the portion of TOA allocated to the Marine Corps). Earlier, during Program Planning, the services' activities are influenced by the funding splits carried over from previous POM cycles, but they are also integrated by means of the planning inputs submitted by the unified CINCs and DON commanders. Later, in the programming End Game, the DON combines Navy and Marine Corps inputs to develop a single, comprehensive POM. But during Program Development, some programming exercises are conducted independently by the Navy and Marine Corps.

The End Game portion of the programming phase is noteworthy not only for integrating Navy and Marine Corps programming decisions, but also for resolving priorities among the Navy's resource-using communities. During Program Development, Navy TOA is suballocated among resource sponsors (described below) who are responsible for identified aggregations of programs and resources. They develop *Sponsor Program Proposals* (SPPs), sometimes called "mini-POMs," that are reviewed from several cross-cutting perspectives. Issues raised by resource sponsors, other review groups, and the Marine Corps are also presented to DON decisionmaking committees. During the End Game, top-level decisions about these issues produce a final allocation of DON funding between the Navy and Marine Corps and among Navy resource sponsor areas.

These features of PPBS in the Department of the Navy are reflected in the organization of the remainder of this chapter. Our examination

of the planning phase incorporates both Navy and Marine Corps planning but distinguishes between planning in the joint arena and Navy Program Planning and Marine Corps Planning. In contrast, we separately examine Program Development in the Navy and that in the Marine Corps. The End Game is treated for the DON as a whole, as are Budgeting and Execution.

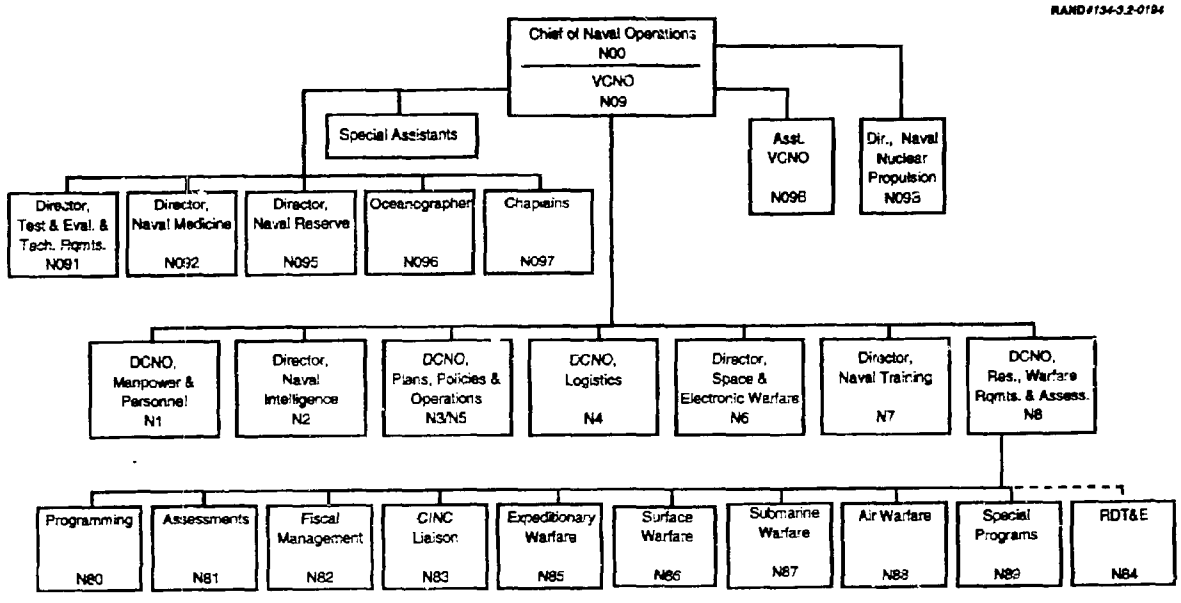
Key Players

A number of officials, organizations, and offices participate in the DON's PPBS activities. Many play several roles—as planners, program developers and reviewers, members of decisionmaking committees, and claimants responsible for budget execution. A brief summary of these participants will set the stage for a more detailed discussion of the process and products of PPBS presented later in the chapter.

Secretary of the Navy. As the senior civilian officer of the DON, the SECNAV must approve and sign all PPBS submissions to the Office of the Secretary of Defense. The SECNAV also has his own analysis shop, called the Office of Program Appraisal, chairs the DON's highest decisionmaking board (the DON Program Strategy Board [DPSB], see "Review and Decisionmaking Committees" subsection below), and approves the initial TOA allocation between the Navy and Marine Corps.

CNO and OPNAV. Figure 3.2 displays the organizational structure of the Office of the CNO. The principal offices involved in planning, programming, and budgeting are[10]

[10]Throughout the remainder of this document, we attempt to provide both the new OPNAV code following the 1992 reorganization and the old OPNAV code; the pairs will usually be in the form new/old, e.g., N1/OP-01 for the DCNO for Manpower and Personnel. When the old code is used prior to the new one in parentheses, i.e., old (new), it is because the old name refers to the actual organization that performed the activity in a given year, and the parenthetical new organization code identifies the organization that would have assumed its responsibilities under the reorganization. For example, during POM development in 1991, OP-01 was actually responsible for manpower and personnel issues during that year, but these issues would now be handled by N1 under the new organization. This would be reported as OP-01 (N1).



SOURCE: Department of the Navy.

NOTE: The dashed line to N84 indicates the uncertain status of N84. At the time of this writing, N84 was not a part of the OPNAV organization but was being reconsidered for inclusion.

Figure 3.2—OPNAV Organizational Structure

- N8/OP-08,[11] the Office of the DCNO, Resources, Warfare Requirements, and Assessment, issues programming guidance and oversees execution of the entire process via three division directors in N80/OP-80, N81/OP-81, and N82/OP-82.
- N80/OP-80, the Programming Division, coordinates the Sponsor Program Proposals that are developed by the resource sponsors (described below) into an overall Navy POM. Under the reorganization, N80 absorbed the responsibilities of OP-07, which served as the arbiter of conflicts arising during the internal POM development process and was sometimes described as the Navy's "honest broker."[12] The director of N80/OP-80 also serves as director of the DON Program Information Center and, in that capacity, coordinates the Navy and Marine Corps POM submissions and reports directly to the SECNAV.
- N81/OP-81, the Assessments Division, oversees assessments conducted by N86/N87/N88/N6, reviewing SPPs from a cross-cutting perspective (across platforms, missions, organizations, etc.), particularly with respect to supporting resources (e.g., training and logistics) that can affect readiness and sustainability.
- N82/OP-82, Fiscal Management Division, coordinates OPNAV budgeting activities with the Navy and OSD Comptrollers' Offices. Dual-hatted as NAVCOMPT staff, N82/OP-82 plays a secondary role in reviewing resource allocations during POM development, but it takes the lead in the execution phase. Operating with its other hat as NAVCOMPT, Budget and Reports, N82/OP-82 runs the budgeting phase and is responsible to SECNAV.

Also under N8 are a number of other offices that are involved in warfare-specific aspects of program development:

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[11]Formerly the Office of Naval Program Planning (OP-08). Until 1989, OP-08 was designated OP-090 (OP-09 was the Vice CNO), and its divisions were designated OP-90, OP-91, and OP-92. Under the 1992 reorganization, OP-08 became N8.

[12]Although unlike OP-07, N80 is expected to exercise greater authority to direct—rather than arbitrate between—the air, surface, and undersea warfare platform sponsors.

- Of these, N86/OP-03 (Surface Warfare), N87/OP-02 (Submarine Warfare), and N88/OP-05 (Air Warfare) are especially important in their roles as "platform barons" and "resource sponsors" responsible for their respective platforms. The reorganization lowered these offices in the OPNAV hierarchy by one tier and subordinated them to the DCNO for Resources, Warfare Requirements, and Appraisals (N8), a vice admiral, to ensure that requirements were articulated by a single voice only.
- The reorganization of OPNAV included the creation of the Expeditionary Warfare Directorate (N85), under a Marine Corps major general, to complement the more traditional Surface Warfare Directorate (N86), headed by a Navy rear admiral. N85 is responsible for identifying and programming expeditionary warfare requirements to ensure successful execution of littoral operations, and with the new emphasis on expeditionary operations and littoral warfare articulated in the DON's white paper . . . *From the Sea*,[13] N85 has become a prominent player. The Navy's amphibious warfare forces come under the aegis of N85, whereas cruisers, destroyers, frigates, and combat logistics forces remain the responsibility of N86.
- Another important new office is that of CINC Liaison (N83), which ensures that the inputs of the warfighting CINCs are represented in each phase of the planning and programming process. Prior to the reorganization, fleet inputs came largely from the type commanders rather than from the warfighting CINCs.

Finally to be described are the offices on the second from the bottom level of the figure (N1 through N8). With the recent reorganization, these offices parallel the J1 through J8 organization in the Joint Staff, are headed by Assistant and Deputy CNOs, and are also contributors to PPBS activities. These offices are discussed in the context of the aspects of the PPBS process in which they participate.

CMC and Headquarters, Marine Corps. Figure 3.3 shows the organizational structure of Headquarters, Marine Corps (HQMC). HQMC offices play key roles in developing, assessing, and costing resource requirements and programs, as follows:

[13]U.S. Department of the Navy (1993).

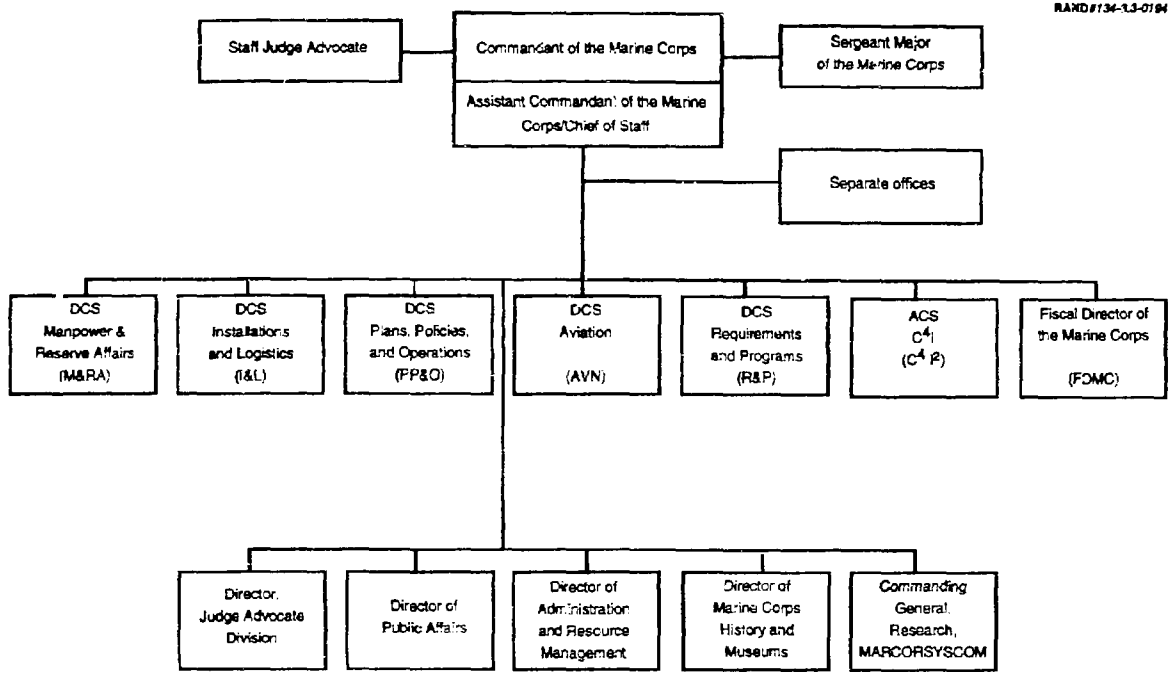


Figure 3.3—Organizational Structure of the Headquarters of the Marine Corps

- The Deputy Chief of Staff (DCS) for Plans, Policies, and Operations (PP&O) is responsible for representing Marine Corps positions within the JCS, and plays a key role in DoD planning phase activities.
- The DCS for Requirements and Programs (R&P) provides continuing liaison with OPNAV and SECNAV during Program Planning and Development, and represents the Marine Corps on key DON review committees. The DCS (R&P) also issues internal USMC guidance on programming procedures, and coordinates analysis of USMC acquisition, programming, and requirements documents.
- The DCS for Aviation (AVN) is the USMC representative for all aviation programs funded through Navy appropriations.
- The DCS for Manpower and Reserve Affairs (M&RA) oversees active, reserve, and civilian manpower by functional area, maintains Marine Corps Table of Organization databases, publishes Authorized Strength Reports and other personnel management reports, and has some manpower costing capability.
- The DCS for Installations and Logistics (I&L) oversees Marine Corps facilities, family housing, and logistics requirements, and maintains equipment inventory and requirements (i.e., Tables of Equipment) databases.
- The Marine Corps Systems Command (MARCORSYSCOM)[14] is the Marine Corps counterpart of the Navy's systems commands, and develops programs for ammunition as well as development and acquisition of weapons and other materiel systems. It is headed by the Commanding General, MARCORSYSCOM.
- The Office of the Fiscal Director of the Marine Corps prepares budget analyses and has been the source of Marine Corps factor manuals. Except for the Marine Corps biennial POM submission, FDMC is responsible for the submission to the DON of all Marine Corps FYDP data.

[14]Formerly Marine Corps Research, Development, and Acquisition Command (MCRDAC).

In addition to these headquarters organizations, the Marine Corps Combat Development Command (located at Quantico, Va.) is responsible for doctrinal development and the design of new force-structure elements. Moreover, MCCDC is the proponent for Fleet Marine Forces in ranking and reviewing Marine Corps POM initiatives.

DON Comptroller. The DON Budget is completed under the oversight of a civilian comptroller (NAVCOMPT) who has direct access to both important budget execution databases and the centralized database (described later in this chapter) that provides DON input to the FYDP.

Unified and Specified Commands. Under Goldwater-Nichols, the CINCs began working directly in the programmatic world to ensure that their priorities were fully recognized by the services. The CINC Liaison office (N83) was created to facilitate "fleet input" from actual CINC and naval component commanders, instead of from type commanders, described in Chapter Two. Specific inputs to the DON planning process come from the unified and specified commanders, including the two CINCs are Navy admirals.[15] Other planning inputs come from all the naval component commanders, the Commandant of the Marine Corps, and Shore Establishment commands. Furthermore, operating and shore commands are directly responsible for implementation of procurement and operating budgets.

Other Organizations. Two other organizations deserve mention here because they perform resourcing and cost studies that can provide useful information about DON costs. One is the Naval Center for Cost Analysis (NCA), which reviews weapons and information system acquisition as part of the Research, Development, and Acquisition process described in Chapter Four. The other is the Center for Naval Analyses (CNA), which is a federally funded research and development center (FFRDC) sponsored by the Department of the Navy and operated by the Hudson Institute. Although CNA once performed many studies of Navy cost and resourcing issues, its focus shifted toward operational and technological issues during the mid-1980s;

[15]CINCLANT and CINCPAC. In the programmatic world, N-800, a one-star admiral, serves as liaison to the Atlantic and Pacific fleet commanders. Steigman (1992c), p. 5. For RDT&E, the CINCs' input comes in through N83.

however, CNA continues to perform some advisory and overview analyses for N81/OP-81.

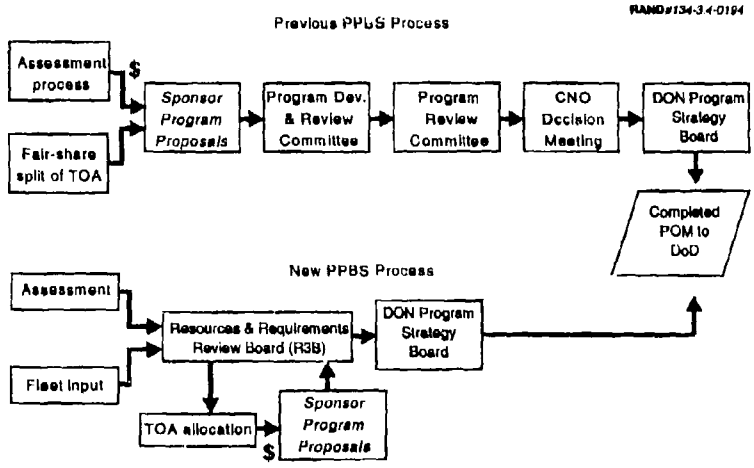
Roles and Responsibilities

The broad scope of naval warfighting activities—surface and undersea, air, amphibious, and ground-based—places extraordinary demands on DON planning and programming. Not only must the DON coordinate warfighting and support functions, but it must undertake complex combined-arms operational planning and prioritize resourcing across warfighting communities. The DON's approach to integrating decisions across all these internal arenas has long depended on a matrix system in which *sponsors* (representing supply) are assigned to examine plans, programs, and budgets from several cross-cutting perspectives, *claimants* (representing demand) submit budget requests within their own areas of execution, and several committees and boards resolve major issues.

The major reorganization the DON went through in 1992 also had ramifications for the POM development process. Figure 3.4 presents the old Department of the Navy POM development process together with the new one for contrast. Most apparent in the figure is that the number of fora involved in the decisionmaking process was reduced. The Resources & Requirements Review Board (R^3B) has been given a preeminent integrating role, and the process as a whole has been somewhat simplified. Also of interest is the entry of the commanders in chief into the programmatic world ("Fleet input"), a result of Goldwater-Nichols.

Sponsors. Sponsors are drawn from the OPNAV and HQMC offices described above. Many sponsorship responsibilities remain the same and reside with the same office from year to year. However, changes may be made as the need arises. Later in this chapter, several tables list specific sponsors and sponsorship responsibilities assigned for the FY 92 POM cycle. Here, we simply describe the three main categories of sponsorship responsibilities:[16]

[16]There are also *program sponsors*, who are responsible for specific programs of materiel systems research, development, and acquisition; they are discussed in Chapter Four. And the Marine Corps sometimes refers to *functional sponsors*, who



SOURCE: U.S. Department of the Navy.

Figure 3.4—Current and Past DON POM Development Processes for Comparison

- *Resource sponsors* develop specific portions of the DON POM—known as Sponsor Program Proposals (SPPs)—subject to fiscal guidance provided by N80/OP-80 and, of course, to program decisions made by various DON review bodies, the CNO, and SECNAV. Inevitably, three of the resource sponsors are N87/OP-02 for Undersea Warfare, N86/OP-03 for Surface Warfare, and N88/OP-05 for Air Warfare; they are responsible for resources (including weapon systems) allocated to operating forces and their directly related shore support, and are also known as "platform sponsors." Other resource sponsors construct portions of the POM related to general supporting functions, such as medical care or manpower, personnel, and training.[17]

submit initiatives in particular functional areas, such as automated data processing and materiel-handling equipment.

[17]The Marine Corps no longer has its own internal-resource sponsors for developing portions of the Marine Corps POM submission. Although a sister service, the Marine

- *Assessment sponsors* are selected offices that prepare warfare and support analyses as part of the planning phase of the programming process.[18] Assessments focus on current fleet preparedness and future force capabilities in particular task areas, such as strategic/theater nuclear warfare or amphibious warfare. Unlike resource sponsors, who together must account for nonoverlapping subsets of the entire POM resourcing profile, assessment sponsors can have somewhat overlapping concerns[19] and address fiscal issues from a relatively broad affordability perspective. During the programming phase, assessment sponsors analyze various operations and supporting structures across warfare task areas, provide baseline estimates of projected costs as an aid to resource sponsors, and review SPPs in terms of their supportability within the overall configuration of DON programs. For example, a typical assessment topic is base operating support. Such assessments are usually more specific than the broader mission-area focus developed in the planning phase. The OPNAV offices that serve as assessment sponsors sometimes wear a second hat as resource sponsors in similar areas.
- *Appropriation sponsors* are charged with oversight of particular DON appropriations. They review SPPs and the Marine Corps POM submission to ensure that programs are properly structured, priced, and supported within fiscal controls, and to advise resource sponsors and N80/OP-80 regarding issues that might arise in the budget review process. They also review assessments for their specific implications for RDT&E[20] and procurement.

...ps in the past was occasionally (and wrongly) identified as a resource sponsor, because it also develops a specific portion of the POM.

[18]Before the reorganization, *appraisal sponsors* prepared warfare and readiness and sustainability appraisals as part of Navy Program Planning; appraisals are no longer performed as part of POM development. Appraisals were once documented in *NO Program Analysis Memoranda* (CPAM), but this form of documentation is no longer used.

[19]For example, all warfare assessments consider matters involving the integration of reserve and active forces, whereas a separate "Total Force" appraisal specifically examines overall active–reserve force balance.

[20]RDT&E refers to the appropriation for research, development, testing, and evaluation of materiel and information systems.

Claimants. Organizations in the DON's executive structure, operational forces, and shore establishment receive specific budget allocations, and they are directly responsible for DON budget execution. Accordingly, these organizations, known as *claimants*, are called upon to submit information for, and review the results of, DON planning, programming, and budgeting activities.

Strictly speaking, and from the overall DON perspective, claimants include all of the Budget-Submitting Organizations (BSOs) listed later in this chapter (Table 3.7). However, the major DON claimants are CINCLANTFLT, CINCPACFLT, the large systems commands (NAVSEA and NAVAIR), and the Marine Corps. Internally, the Marine Corps regards FMFLANT and FMFPAC, along with MARCORSYSCOM, as major green-dollar claimants.

Review and Decisionmaking Committees

The October 1992 draft OPNAV Instruction 5420.2Q disestablishes most of the panels, committees, and boards of the former CNO Executive Board process, including the Strategic Readiness Panel (SRP), Advanced Technology Panel (ATP), Acquisition Review Council (ARC), Program Review Committee (PRC), Program Development Review Committee (PDRC), Warfare Requirements Board (WRB), OPNAV Program Review Council (OPRC), and the Non-Nuclear Ordnance Planning (NNOP) board. Also eliminated was the CNO Executive Board (CEB). Issue decisions and policy formulation are now performed through a hierarchy of committees coordinated by N8 through the Resources and Requirements Review Board. These committees are described in the following subsections.

Department of Navy Program Strategy Board (DPSB). The DPSB is chaired by the SECNAV, and includes the under secretary and selected assistant secretaries,[21] the CNO and Vice CNO (VCNO), the DCNO for Navy Program Planning, and the Commandant of the Marine Corps and his DCS for Requirements and Programs. The DPSB was created by former SECNAV John Lehman as the highest

[21] Specifically, they are the Assistant Secretaries for Research, Development, and Acquisition (RDA); for Manpower and Reserve Affairs (M&RA); and for Fiscal Management (FM).

and last level of committee review, paralleling the role of the Defense Planning and Resources Board (DPRB) in the OSD PPBS system. However, the DPSB's role in issue resolution has gradually expanded to ever-earlier points in the PPBS process. The DPSB hearings result in SECNAV-directed or -approved programmatic actions that constitute the final decisions for DON POM preparation.

Resources and Requirements Review Board (R3B). The R3B is chaired by N8, with executive management performed by N80, and membership from across the OPNAV organization,[22] USMC (R&P), NAVAIR, NAVSEA, SPAWAR, CHINFO (Chief of Naval Information), and CNA. Its purpose is to develop warfare requirements and resource issues that will have significant programmatic impact on the Navy's future. The R3B has three special panels to assist the board in its deliberation of issues related to ship and aircraft configuration, and non-nuclear ordnance requirements.[23]

Program Policy Board (PPB). The PPB is chaired by N8, with broad membership across the DON. Its executive management is performed by N80.[24] Its purpose is to support the PPBS process by recommending planning and programming guidance based on joint mission and support area reviews, and by recommending the disposition of sponsor change and program proposals.

Navy Staff Executive Steering Committee (ESC). Chaired by the VCNO, the Navy Staff Executive Steering Committee reviews and directs the development of issues to be considered by the CNO Executive Steering Committee (below).[25] The agenda is set jointly by the offices of the CNO and VCNO.

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[22]OPNAV members include N80, N81, N82, N83, N85, N86, N87, N88, N89, N12, N13, N2B, N4B, N51, N6B, N7B, N091, N095, and N096.

[23]The panels are the Ship Characteristics Improvement Board (SCIB), the Air Characteristics Improvement Board (ACIB), and the Non-Nuclear Ordnance Board (NNOB) working groups. The panels are convened at the call of the panel chair to discuss specific issues, and each special panel is expected to have a working group designated by the panel chair.

[24]Members include N1, N3/5, N4, N6, N7, N095, N80, N81, N82, N83, USMC(R&P), SYSCOMs, the Principal Deputy Assistant Secretary of the Navy, ASN(RDA) (PDASN), and the DON's Office of Program Appraisal (OPA).

[25]Membership includes N1, N2, N3/5, N4, N6, N7, N8, N093, N095, all SYSCOMs, Legislative Assistant to the Commandant (Marine Corps) (OLA), CHINFO, Comman-

CNO Executive Steering Committee. Chaired by the CNO, the members of the Chief of Naval Operations Executive Steering Committee include the VCNO, CINCPACFLT, CINCLANTFLT, and CINCUSNAVEUR. Its purpose is to review and develop the uniformed-services position on issues and policies of importance to operating the Navy in the near term and to shaping the future Navy. The steering committee also maintains relations with the DON Executive Steering Committee.

Marine Corps POM Working Group. This working group is a forum for coordinating initial staff action for developing the Marine Corps POM submission to the DON.

Marine Corps Program Coordination Group (PCG). Chaired by the DCS for Requirements and Programs, the PCG is composed of senior representatives of each Marine Corps DCS and Assistant Chief of Staff (ACS), MARCORSYSCOM, the Warfighting Center, the Training and Education Center, and special staff sections; FMF commanders are invited to participate. The PCG reviews the overall program recommended by the POM Working Group and may direct changes. PCG recommendations are forwarded to the Assistant Commandant's Committee.

Marine Corps Assistant Commandant's Committee. This is the highest-level planning, programming, and budgeting forum within the Marine Corps. In addition to the assistant commandant, it consists of the Deputy Chiefs of Staff, the Assistant Chief of Staff for C4I2,[26] the Fiscal Director of the Marine Corps, and the commanding generals of MCCDC and MARCORSYSCOM.

MANAGEMENT TOOLS

This section describes the DON management tools that support costing calculations.

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der, Maritime Sealift Command (COM MSC), Office Judge Advocate General (OJAG), and Marine Corps representation.

[26]Command, control, communications, computers, intelligence, and interoperability.

The Navy Program Database

A decade ago, the DON used the Navy resource model known as NARM that both provided basic Navy force-structure cost estimates and managed a central database that supplied data for POM and budget development. NARM's costing capability was abandoned in 1976, but NARM remained a tool for program database management. It could be used to report program and funding data for resource sponsors, claimants, and budgeteers.

However, a few years ago, the Navy replaced NARM entirely with a new, automated system that provides on-line (but controlled) access to the program database, called the Program Analysis Toolkit (PAT). The resulting system provides selective access to a single, comprehensive program database that contains data from FY 87 to the present. During Navy programming activities, the database serves N8/OP-08, resource sponsors, and claimants via what is known as the Navy Headquarters Programming System (NHPS). During budgeting, the system serves claimants and the Navy Comptroller's office, and is known as the Navy Headquarters Budgeting System (NHBS). A datafile in the system is known as a RAD, which previously meant Resource Allocation Display but has been redefined as Resource Allocation Database.

The underlying database provides an interface to the Navy's *Future Year Defense Plan* submissions, and thus reports data in the FYDP's two main dimensions: appropriations and Major Force Programs (MFPs).[27] The database accounting structure subdivides Major Force Programs into the same program elements used by OSD and also subdivides appropriations into subappropriations. For O&M the breakdown is into activity groups and subactivity groups[28]

[27]The appropriations are listed below in Table 3.3. The OSD-defined Major Force Programs are as follows: 1—Strategic Forces; 2—General-Purpose Forces; 3—Intelligence and Communications; 4—Airlift and Sealift Forces; 5—Guard and Reserve Forces; 6—Research and Development; 7—Central Supply and Maintenance; 8—Training, Medical, and Other General Personnel Activities; 9—Administration and Associated Activities; 10—Support of Other Nations; and 11—Special Operations Forces.

[28]Subactivity groups provide considerable detail about precisely how funds will be used, such as the installation to which base operating resources apply. Although re-

(AGs/SAGs). For procurement appropriations, the breakdown is into line items; and for the RDT&E appropriations, the breakdown is into RDT&E program elements and their subsidiary projects.

The data are also organized by resource sponsor area and claimant. Resource sponsors can access all the data within their own sponsorship category and enter changes during their development of Sponsor Program Proposals. Claimants can access data within their own claimancies, but they cannot enter changes. Only N80/OP-80 and NAVCOMPT/N82/OP-82 have access to the entire database, the former during POM development, and the latter during budgeting. Other variables recorded in the database are

- Manpower activity code: the unit identification code of the ship, squadron, or shore activity
- Manpower duty status: officer or enlisted
- Civilian type of hire: U.S., foreign direct, indirect
- Issue: reason for change in the database
- Manpower end-strengths and procurement quantities
- Funding level: whether funded for submission to OSD or unfunded and subject to further internal review
- Task area for warfare and support assessments
- Pillar (e.g., sustainability), subpillar, and "quad code" for associating resources with force-structure, investment, readiness, or sustainability categories.[29]

However, the database does not contain other supplementary data on the DON program, such as operating levels or unit resource requirements.

Within a PPBS cycle, the DON normally updates its FYDP data six times; each update results in a pair of RAD reports: An odd-numbered RAD provides the FYDP data, organized by PE and

source sponsors report that such information is quite helpful to them, NAVCOMPT is reportedly seeking to eliminate this level of detail from the central database.

[29]For procurement programs, the database also identifies the Program Executive Officer.

appropriation; an even-numbered RAD refers to database extracts prepared for claimants. The RADs corresponding to the three major biennial FYDP updates are

- RAD I: The Budget Estimate Submission to OSD
- RAD III: The President's Budget to Congress
- RAD IX: POM Submission to OSD.

Each RAD reports data for the prior year, the current and budget years, and four out-years. The program database also includes files that record the changes made between FYDP updates and, hence, provides an audit trail between RADs.

Macrolevel Costing Models

In addition to the Navy program database, two systems have recently been developed to support Navy costing activities at a macrolevel.

The DON Long-Term Fiscal Requirements Model.[30] The Center for Naval Analyses has developed a Digital Equipment Corporation (DEC) VAX-based model to enable users to quickly assess the implications of alternative procurement plans, force levels and structure, manning allowances, and operating tempos. Its projections can be displayed in a "four pillars" format—force structure, modernization, sustainability, and readiness—and can optionally display fiscal requirements by appropriation account for ships by type and for aircraft by type, model, and series. The model was used in OP-07[31] to support the CNO Executive Panel in *Summary Warfare Assessments* (SWAs); in N81 to support "what if" and trade-off analyses, in response to requests from N80; and at CNA for affordability assessments of various aviation plans. How and whether this model will be used in the current OPNAV structure are unclear.

Integrated Program Analysis System (IPAS). Developed by Mathtech, IPAS is a microcomputer-based system that allows users to specify the force structure in significant detail (e.g., number of

[30]See Eskew et al. (1989).

[31]Disestablished; functions have been absorbed into N8.

ships and aircraft by type), then fits regression models to project a variety of direct and indirect costs over the next 20 years, including infrastructure, operations and support, maintenance, shore personnel, and training costs. IPAS is aimed at readiness and support rather than at research and development and procurement. It is not clear whether the system is at present being used within N8, but it has reportedly was used by N812 for "what if" analyses to assist in the development of a profile of an affordable fleet.

The next section describes joint, Navy, and Marine Corps activities during the DoD planning phase of PPBS.

JOINT PLANNING AND NAVY AND MARINE CORPS PROGRAM PLANNING

The planning phase of PPBS addresses two issues: what future combat capabilities and warfighting forces should be, and how to make the transition from the current force to the future one while maintaining operational readiness and deterrence. As described, the first issue is the "operational track," where planning aims to assess threats, develop overall military strategy, and guide the development of OPLANs (operational plans) for force employment in the event of a military contingency; a principal DoD-level product of this track is the *Joint Strategic Planning Document.*

Meanwhile, the "executive track" is concerned with the second issue: evaluating force options and risks, and establishing resourcing guidance for subsequent development of POM submissions; the principal DoD product of this track is *Defense Planning Guidance.* The time frames covered by these analyses include the long-range horizon (10 to 20 years into the future), the mid-range period up through the end of the FYDP, and even the near term for issues of special concern.

All the services participate in JCS planning exercises and decision-making deliberations; they also carry out related internal planning and assessment activities. As we indicated above, however, the DON distinguishes between "planning," which is viewed as a joint JCS/OSD process, and Navy Program Planning, which both coordinates internal planning with the joint process and represents a preliminary phase of DON POM development. Both aspects of the planning phase are described below.

DON Participation in Joint Planning

In the JCS/OSD arena, the executive planning track is overseen by the Defense Planning and Resources Board and the operational track is overseen by the Office of the Chairman of the JCS. DPRB membership includes the service secretaries;[32] therefore, the DON is directly represented by the SECNAV. The DON is also represented in the JCS by both the CNO and the Commandant of the Marine Corps. In addition, the SECNAV's Office of Program Appraisal and OPNAV's Plans, Policies, and Operations Division (N3/N5/OP-60) play major roles in integrating Navy Program Planning with joint planning activities.

Three of the principal products of joint planning are the *National Military Strategy of the United States,*[33] which articulates the military component of the U.S. national security strategy;[34] *the Joint Military Net Assessment* (JMNA),[35] a comprehensive military assessment of the adequacy of the military forces and capabilities of the United States and its allies against those of potential adversaries within the framework of the *National Military Strategy;* and the *Joint Strategic Planning Document,* which evaluates risks and proposes force options over the mid-range planning horizon, including such considerations as deterrence, force deployment, and special activities, such as drug interdiction. The DON's contribution to the JSPD is the *White Paper Revision,*[36] which is based on the unified and specified CINCs' reviews of previous maritime strategy, along with their five most pressing maritime issues. As described below, the *White Paper Revision* is an early product of Navy Program Planning and provides top-down guidance for subsequent assessment activities.

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[32]The chairman of the DPRB is the Deputy Secretary of Defense. Other members include the OSD Undersecretaries for Planning and Acquisition, the Chairman of the Joint Chiefs of Staff, and the OSD Assistant Secretary for Program Analysis and Evaluation.

[33]See Powell (1992a).

[34]See Bush (1992).

[35]See U.S. Department of Defense (1992a). For a brief discussion of the JMNA, see Powell (1992c), pp. 9–11. The JMNA is prepared in accordance with Section 113 (i) of Title 10 of the *United States Code.* Both classified and unclassified versions are published.

[36]Formerly called the *Maritime Strategy Revision.*

Similarly, other DON planning activities play roles in both joint planning and Navy Program Planning. For example, an early activity in Navy Program Planning has each of the claimants, such as CINCLANTFLT and NAVSEA, submit 10 prioritized issues to OPNAV. In the context of Navy Program Planning, these issues are essentially requests for revised resourcing in the next POM and include updated pricing for procurement programs and recommended offsets for reallocation of limited funds (the offsets are required, but rarely submitted). For joint planning, issues raised by claimant submissions can also be presented during DPRB deliberations and influence *Defense Planning Guidance.*

Navy Program Planning[37]

Figure 3.5, which is based on a diagram from the Navy's 1991 PPBS Training Course, illustrates main elements of Navy Program Planning. It covers a period of about one year, starting with an initial call for inputs from various operational commands and ending at about the time the DPG is published. The figure identifies key Navy activities and products that can be useful sources of background information for cost analysts. They are described in the following discussion, which also identifies related Marine Corps activities and products.

POM Serials. Within the Navy, POM serials are a series of memoranda issued by N80/OP-80 to specify Navy procedures for conducting PPBS activities during a given POM cycle. The first of these is POM Serial XX-1 (for POM cycle XX), which provides a complete schedule of major PPBS milestones and lists sponsorship responsibilities. Its publication is considered the starting point for Navy Program Planning. Similarly, the DCS for Requirements and Programs issues POM serials for Marine Corps planning and pro-

[37]Each phase of the DON PPBS covered below is described in terms of players, decisionmaking processes, and output products. To relate the DON to the larger PPBS process taking place in the DoD, the reader should return to Figure 3.1, which relates the DON PPBS cycle to that of DoD.

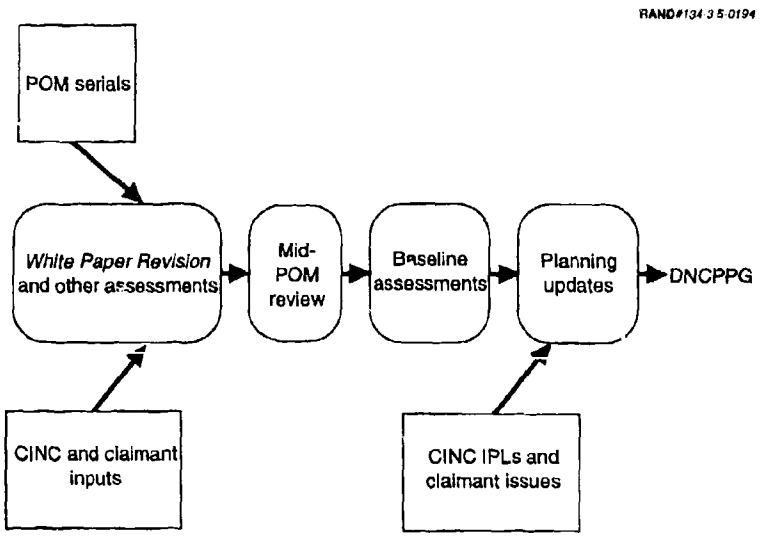

Figure 3.5—Schematic of Navy Program Planning

gramming. The first POM serial is followed by additional memos providing clarification and additional instructions.

CINC and Claimant Inputs. An initial task of Navy Program Planning is to collect inputs from the unified and specified commands and other DON claimants. The CINCs' inputs emphasize long-range needs, do not require offsets for the additional resources they request, are transmitted both to the joint arena and to OPNAV, and must be addressed in the annex to the next POM. Claimants' inputs are issues related to mid-term (i.e., POM-period) programs, require offsets, and must be addressed by resource sponsors in their POM proposals. The CINCs' submissions are central to the *White Paper Revision*. Both CINC and claimant inputs are recognized in the DON's internal assessment process and, as mentioned earlier, are facilitated by the CINC Liaison (N83) established under a rear admiral.

Assessments. Before the 1992 reorganization, "appraisals" reviewed force-structure issues within a task area from a warfighting perspective. The task areas that were subject to appraisal varied somewhat from year to year.[38] Appraisals have now been supplanted by joint mission area assessments, which provide a comparable warfighting perspective but also include consideration of mission areas where other services could provide assistance, other service programs that contribute to the mission of the naval service, and other service programs whose success is important to the naval service.

At the top level is the *White Paper Revision*, which is a direct input to JCS/OSD planning, is prepared at the outset of Navy Program Planning, and serves as the top-down strategic integrating principle for the other Navy assessments and for Marine Corps planning activities.[39] The mission area assessments review force-structure issues within each task area, including both warfare and warfare support task areas, from a warfighting perspective. As can be seen in Table 3.1, many of the task areas listed also have a distinctly joint perspective.

The assessments, reviewed both by the R3B and the PRB,[40] examine force structure in detail and are fiscally constrained, with the constraints placed largely on investment accounts (especially procurement). Constraints come both from the prior programming cycle and from new guidance issued by POM serial.[41]

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[38]Appraisals included: a *Maritime Strategy Revision* (now called *White Paper Revision*); a *Summary Warfare Appraisal*; *Logistics/Fleet Support*; *Manpower, Personnel, and Training*; *Technology and Development*; *Total Force*; a variety of warfare appraisals (*Strategic/Theater Nuclear Warfare, Strike/Anti-Submarine Undersea Warfare, Anti-Air Warfare, Anti-Submarine Warfare, Mine Warfare, Amphibious Warfare, Electronic Warfare, Special Warfare*, and *Chemical Warfare*); *C*^{3}*I*; *Space*; and *Readiness and Sustainability*. See U.S. Department of the Navy, POM Serial 92-1 (1988), p. 4. Under the old system, the appraisal process also yielded *Top-Level Warfare Requirements* (TLWR) and *Warfare Master Plan* documents.

[39]The current concept is articulated in the Navy white paper . . . *From the Sea* (U.S. Department of the Navy, 1993) and its subsequent refinements.

[40]Appraisals were reviewed by the Program Development Review Committee and, perhaps, the Program Review Committee or CNO Executive Board; the PDRC and PRC were disestablished under the reorganization.

[41]Although seldom actually done in practice, appraisals that recommended expanding a program were also supposed to offer prioritized offsets within the same area. For example, increasing the procurement of one type of ASW aircraft would generally

Table 3.1

Joint Mission/Support Area Assessments[a]

Assessment	Lead (Participation By)
Mission Area Assessments	
Joint Strike[b]	N88 (N6/N85/N86/N87)
Joint Littoral[b]	N86/85 (N6/N87/N88)
Joint Surveillance[b]	N87/88 (N6/N85/N86)
Joint Space and Electronic Warfare (SEW)/Intelligence[b]	N6 (N85/N86/N87/N88)
Strategic Deterrence[b]	N87 (N6/N85/N86/N88)
Strategic Sealift/Protection[b]	N86 (N6/N85/N87/N88/N4)
Support Area Assessments[c]	
Readiness and Support[b]	N4 (N6/N85/N86/N87/N88/N1/N7)
Manpower, Personnel, and Shore Training[b]	N1/N7 (N6/N85/N86/N88/N4)
Infrastructure	N81 (N6/N85/N87/N88/N4/N1/N7)
Integrated Assessment	
Investment Balance Review	N81 (N6/N85/N86/N87/N88/N4/N1/N7)

SOURCE: "Joint Mission/Support Area Assessments," DON chart, dated 2 October 1992.

[a]See U.S. Navy, Chief of Naval Operations (1993), pp. 24–27, for a description of each of these joint mission areas.

[b]N81 provides necessary analytic support.

[c]The *Readiness and Support* assessment and the *Infrastructure* assessment have since been consolidated into a single assessment, resulting in eight assessment areas altogether.

The Investment Balance Review (IBR) in Table 3.1 is an overall integrative assessment. Undertaken at the completion of the other assessments, it determines the overall mix of desired capabilities and their supporting programs, in the context of the *White Paper Revision*.[42] It is in the IBR that trade-offs match fiscal constraints with

imply reducing procurement of another ASW weapon system. It is unclear whether such offsetting is expected in assessments.

[42]Under the old system, *two* appraisals combined information across task areas: the *Summary Warfare Appraisal*, prepared by OP-07 (now part of N8), and the *Readiness and Sustainability Appraisal* (R&SA), prepared by N81/OP-81. These appraisals contained planning guidance for the remainder of the Navy programming process, including important funding and force-structure specifics. For example, POM Serial 92-1 required the SWA and R&SA to make specified funding decrements from the January 1989 FYDP, and directed the SWA to incorporate initial ship and aircraft procurement plans (prepared by N86/OP-03 and N88/OP-05, respectively). Although

required capabilities, and recommendations for new *Mission Needs Statements* (MNSs) are discussed.[43] The IBR is a flag (i.e., admiral) and general officer forum for discussion and prioritization of key issues that surface in each of the individual area assessments. Topics range from a review of current programs for modification or cancellation, presentation of new initiatives aimed at saving money, or identification of new programs needed to meet current and emerging warfare requirements. The IBR is chaired by the DCNO for Resources, Warfare Requirements, and Assessments (N8), and is intended to achieve consensus in the programs decision process. The IBR is then briefed to selected CINCs, whose comments are reflected in the final product.

The assessment process includes Marine Corps considerations supplied through CINC and claimant submissions, but the USMC also develops its own plans and assessments. Principal products of Marine Corps planning remain:[44]

- The *MAGTF Master Plan* (MMP), which directs and integrates the development of employment concepts, strategies, and capabilities of Marine Air-Ground Task Forces. The MMP lays the operational foundation for the organization, equipping, training, and development of doctrine and operational techniques for MAGTFs. It also provides guidance for the development of detailed subordinate plans: the *MAGTF Command Plan;* the *MAGTF Ground Combat Plan;* the *MAGTF Aviation Combat Plan;* and the *MAGTF Combat Service Support Plan.*
- The *Supporting Establishment Master Plan* (SEMP), which guides the development of Marine Corps supporting-establishment ca-

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the focus of these overview appraisals was on the POM years, the SWA often addressed longer-term changes in the size and age of the Navy's ship and aircraft fleets as well. Further, the appraisal sponsor for those areas was usually the Office of the DCNO for Naval Warfare, OP-07 (now part of N8), but the Director of the Naval Reserve, N095/OP-095, supplied information about Naval Reserve warfighting capabilities and other offices contributed specialized information on such aspects as training needs; N81/OP-81 also contributed appraisals for selected supporting areas and functions.

[43]See U.S. Navy, Chief of Naval Operations (1993), p. 24, for an illustration of the relationship between the capabilities espoused in . . . *From the Sea* and the joint mission assessment areas.

[44]Unlike OPNAV, the Marine Corps did not undergo a reorganization in 1992, although, as mentioned earlier, MCRDAC was redesignated MARCORSYSCOM.

pabilities and priorities. It is developed concurrently with the MMP and addresses all non-FMF resources required to support warfighting forces.[45]

The Marine Corps also develops a *Summary Warfighting Assessment Plan* corresponding to the Navy's old *Summary Warfare Appraisal.* The Deputy Chief of Staff for Requirements and Programs prepares this plan, with key assistance from the Commanding General of the Marine Corps Combat Development Command.

Mid-POM Review (MPR). A noteworthy feature of Navy Program Planning is that it conducts a preliminary POM update during what is known as the "Mid-POM Review" (MPR). Navy program data from the latest FYDP are updated to reflect congressional actions, changes in DoD pricing guidance, and other "fact-of-life" adjustments (e.g., new constants, political, economic, and otherwise; reallocations resulting from new policies). Beyond that, however, POM serials prepared by N80/OP-80 issue initial fiscal guidance that incorporates expected changes in DON funding and major procurement programs. The updated information is distributed to claimants and resource sponsors,[46] and leads to MPR updates that are analogous to POM submissions within each resource sponsor's area. In effect, Mid-POM Review provides an initial iteration of the POM development process described more fully later in this chapter; the difference is that MPR updates data for the budget and POM period from the previous POM cycle, whereas the subsequent Program Development phase will extend decisions to the end of the new POM period.

Baseline Assessments. These assessments examine particular areas of interest from a broad, integrative perspective, raising issues and options for further consideration and taking account of trade-offs between costs and capabilities. However, baseline assessments address basic categories of resources or supporting activities rather

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[45]The SEMP is a less mature planning document containing less precise planning guidance than the *MAGTF Master Plan.* While this planning document matures, past experience in support resource utilization serves as a guide to future needs for POM development.

[46]In the Marine Corps, this is known as the Marine Corps Program Review Update (MCPRU).

than combat force structure. The topics for which *Baseline Assessment Memoranda* (BAMs) were required for the POM92 cycle are listed in Table 3.2. For POM94, however, the number of BAMs was reduced after an internal review that suggested some previous assessments (e.g., for MPT and ILS) had not provided much information useful to resource sponsors.

Since each baseline assessment examines a supporting resource or activity in the aggregate, assessments can identify trends that would not be visible within a single warfare task area. For example, an assessment can forecast trends in aggregate shipyard overhaul workloads and consider the potential implications for backlogs or costs.

DON fiscal guidance for the "blue–green split," the split of programming responsibility based on DON's appropriation structure (see next section, "The Program Development Phase"), in the past has been based on a long-standing Navy–Marine Corps agreement approved by the Assistant Secretary of the Navy for Financial Management. Basically, the agreement calls for computing the annual ratios of green dollars to overall TOA shown in the last pub-

Table 3.2

POM92 Cycle Baseline Assessment Memoranda and Assessment Sponsors

Assessment	Sponsor[a]
Manpower, Personnel, and Training (MPT)	OP-01 (N1)
Logistics:	OP-04 (N4)
Integrated logistic support (ILS)	
Munitions rework	
Spares (including ship and aircraft depot-level repairables)	
Base readiness	
Tech manuals	
Advance base functional components	
Civil engineering support equipment (CESE)	
Ship Maintenance/Modernization	OP-04
Physical Security	OP-09N (N09N)
Mapping, Charting, and Geodesy	OP-096 (N096)
Ship Operations	OP-03 (N86)

SOURCE: POM Serial 92-1 (U.S. Department of the Navy, 1988), p. 6.

[a]New names under 1992 reorganization are in parentheses.

lished FYDP[47] and applying those ratios to the TOA specified in the new DoD fiscal guidance.[48] The resulting amount of green dollars has typically been a bit over 9 percent of total TOA. With the movement away from "fair-sharing" among the warfare barons, it seems probable that an automatic split between the services might be given close scrutiny as well, although there is as yet no evidence that this has happened.

A further specific goal of each baseline assessment is to project the support resource and funding needs associated with various Navy programs, and thus to aid resource sponsors in their costing of supporting elements. According to POM Serial 92-1, "For each topic/sub-topic the baseline assessment will provide units of measure, standard goals where established, the degree to which the current program achieves that goal, [and] the funding required to balance the program." In addition, Serial 92-1 promised that N80/OP-80 would work with assessment sponsors to develop a database for making automated comparisons between the baseline findings and the resourcing portrayed in the resource sponsors' SPPs.

Final Planning Updates. The final stages of Navy Program Planning bring together, update, and finalize the various submissions and products of the entire process. The CINCs submit their official Integrated Priority Lists (IPLs) of five longer-term warfighting issues to both the Navy and JCS/OSD, Navy claimants update their issue submissions, and resource sponsors incorporate revisions in their Mid-POM Review *Sponsor Program Proposals.* Relevant assessments and the Navy program database are also updated to reflect all the approved changes that will form the baseline for subsequent POM development.

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[47]The definition of *last published FYDP* has proven ambiguous in recent years. Beginning with POM94, the services are resolving the ambiguity by means of a prior agreement concerning precisely which FYDP version will be used for this calculation. By using a recent version of the FYDP in each POM cycle, the DON allows the split to recognize previous POM revisions resulting from OSD, congressional, and White House decisions.

[48]There are two additional features to this calculation. First, funds set aside for the Foreign National Intelligence Program (FNIP) are removed from all DON TOA totals before the computations proceed. Second, the ratio calculated from the final year of the previous POM period is extended to the two out-years of the current POM.

DON Consolidated Planning and Programming Guidance (DNCPPG). Just as the DoD PPBS planning phase culminates in issuance of *Defense Planning Guidance,* Navy Program Planning culminates in issuance of a DON analogue, the *DON Consolidated Planning and Programming Guidance.* It states the decisions of the SECNAV about priorities and programming principles to be used in the development of the POM; it is essentially SECNAV guidance to the CNO and the Commandant of the Marine Corps.[49]

Other Program Planning Products

Two other documents are produced by the Marine Corps during the Program Planning phase that project mission trends or state objectives that can influence future developments in force structure, doctrine, or training: the *Marine Corps Long-Range Plan* (MLRP); and the *Marine Corps Campaign Plan* (MCCP). In addition, per general DoD directive, the DON submits to OSD its *Force Posture Statement,* which covers both Navy and Marine Corps force posture.

THE PROGRAM DEVELOPMENT PHASE

The issuance of the DNCPPG and associated DON fiscal guidance marks the DON's transition from Program Planning to Program Development. In particular, fiscal guidance establishes an initial split of the DON's TOA limits between the Navy and Marine Corps, enabling the two services to conduct internal programming activities with their blue–green-split portions of the overall POM.

Table 3.3 lists the DON's appropriations and indicates how they are assigned to blue and green categories.

The blue–green split does not accurately reflect each service's participation in Program Development. In addition to the amount deter-

[49]In past years, the DNCPPG was accompanied by a *Consolidated Planning and Fiscal Guidance* (CPFG) document that split DON fiscal limits between the Navy and Marine Corps and among resource sponsors within the Navy. Currently, however, N80/OP-80 distributes fiscal guidance to resource sponsors individually via memoranda. The basis for splitting DON fiscal limits among users is described in the next section, on Navy Program Development.

Table 3.3

Programming Responsibilities for Department of the Navy Appropriations

Programmed by the Navy: Blue Dollars
Military Personnel, Navy (MPN)
Reserve Personnel, Navy (RPN)
Operations and Maintenance, Navy (OMN)
Operations and Maintenance, Navy Reserve (OMNR)
Aircraft Procurement, Navy (APN)
Weapons Procureme Navy (WPN)
Shipbuilding and Co ion, Navy (SCN)
Research, Developmen, Test, and Evaluation, Navy (RDT&EN)[a]
Other Procurement, Navy (OPN)
Programmed by the Marine Corps: Green Dollars
Military Personnel, Marine Corps (MPMC)
Reserve Personnel, Marine Corps (RPMC)
Operations and Maintenance, Marine Corps (OMMC)
Operations and Maintenance, Marine Corps Reserve (OMMCR)
Procurement, Marine Corps (PMC)
Allocated for Programming Purposes: Blue and Green Dollars
Military Construction, Navy (MCON)
Military Construction, Navy Reserve (MCONR)
Navy Stock Fund (NSF)
Family Housing, Navy and Marine Corps (FHN&MC)

SOURCE: Unpublished briefing charts from the DONPIC PPBS Training Course, March 1991.

[a]A portion of RDT&EN funds is also set aside for Marine Corps Programming but is not considered part of the blue-green split.

mined by the split, the Marine Corps also programs a specified portion (usually about 3 percent) of the RDT&EN appropriation. "Blue-in-support-of-green" dollars are blue (Navy) dollars programmed to support Marine (green) requirements. Furthermore, representatives of the Marine Corps directly participate in Navy programming activities for other blue-dollar accounts, especially for the flying-hours program covered by OMN and OMNR appropriations. And, of course, the two services must coordinate programs that provide mutual support, such as Navy personnel for Marine Corps medical support and Marine Corps personnel for security services.

Although the blue–green split is not a clearly defined indicator of the services' shares of resources, the split specifies critical funding limits that will guide each service during its Program Development activities. Within the Navy, blue-dollar TOA will be further allocated to resource sponsorship areas. Within the Marine Corps, green-dollar TOA will be allotted to appropriations. Both processes are described below.

Navy Program Development

The main activities of Navy Program Development are summarized in Figure 3.6, which, although simplified, correctly indicates that the primary goal of this phase is to develop the Navy's *Sponsor Program Proposals*. Prepared by resource sponsors, SPPs are mutually exclusive aggregations of resources in various program areas that, when summed and combined with the Marine Corps POM submission, account for the DON's total TOA.

Typically, about a dozen SPPs account for the entirety of Navy TOA. Just three of them provide for all resources directly associated with the Navy's three categories of warfighting platforms: submarines (sponsored by N87/OP-02), surface ships (N86/OP-03), and aircraft

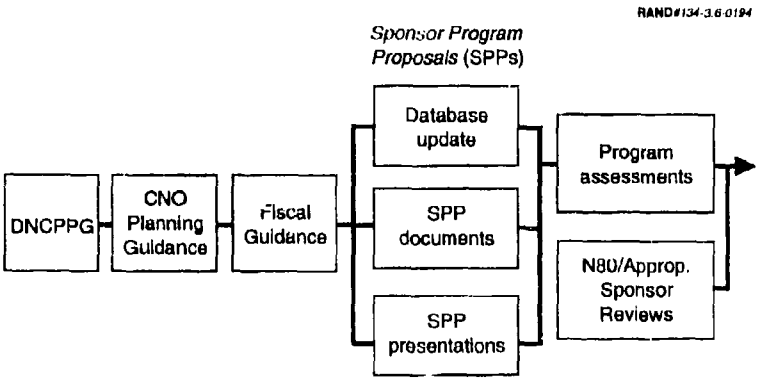

Figure 3.6—Schematic of Navy Program Development

(N88/OP-05). For example, the SPP for submarines covers construction, operations, overhaul and modernization (e.g., installation of new radar systems for the vertical launch Tomahawk missile), manning, and directly related training. Other SPPs account for supporting activities that are not readily disaggregated into platform-specific elements.

The SPP areas and corresponding resource sponsors for the POM92 cycle are listed in Table 3.4.[50] Although the titles of the SPPs may appear self-explanatory, the boundaries among them are not. For example, Manpower, Personnel, and Training (sponsored by N1/OP-01) in the past did not account for all personnel and training resources. Training centers that dealt with platform-specific training were resourced by the related platform sponsors (e.g., N88/OP-05 for strike aircraft training, N87/OP-02 for submarine training); MPT

Table 3.4

Navy Resource Areas and Resource Sponsors for POM92

Resource Area	Sponsor
Manpower, Personnel, and Training	OP-01 (N1/N7)[a]
Family Housing	OP-01
Submarine Warfare	OP-02[b] (N87)
Surface Warfare	OP-03[b] (N86)
Logistics (including sealift & shipyards)	OP-04 (N4)
Air Warfare (including aviation depots)	OP-05[a] (N88)
Intelligence	OP-092 (N2)
Medical	OP-093 (N093)
Command and Control	OP-094 (N6)
Oceanography	OP-096 (N096)
RDT&E/Acquisition	OP-098
Administration/DoD Support	OP-09B (N09B)

SOURCE: POM Serial 92-1 (U.S. Department of the Navy, 1988).

[a]Under the 1992 reorganization, responsibilities for training were shifted to N7, Director, Training and Doctrine.

[b]Sponsor is also known as a platform sponsor; others are support sponsors. Names of equivalent organizations under 1992 reorganization are in parentheses.

[50]The number and purview of resource sponsors have not been absolutely stable over time. For example, the number of SPPs was 14 in the POM87 cycle.

accounted for entry-level training (in "A schools") that was not associated with a particular warfighting community, and schools at a given installation might therefore be resourced by different sponsors.[51] Furthermore, each SPP includes the end-strengths for its own manpower, with MPT accounting for personnel in the individual accounts (personnel in entry-level training, in transient status, etc.). Although it can appear somewhat opaque to outsiders, because each POM cycle's SPP is built upon the legacy of past program decisions, it is not difficult for resource sponsors and others who regularly participate in Program Development to determine which SPP covers a particular program or activity.

Establishing SPP Fiscal Guidance. After overall TOA has been split into blue- and green-dollar portions, the blue-dollar amount is allocated to Navy resource sponsors for SPP development; under the management philosophy established during POM92, the initial SPP allocations had to reflect the latest FYDP. Thereafter, the main purpose of the initial guidance would be to extend the guidance to the new out-years, and any adjustments that alter previously approved programs would derive from the Navy's program review process rather than being established at the outset.

In practice, however, the latest FYDP totals for TOA rarely match current DoD fiscal guidance, so adjustments are required at the outset. The adjustments, which currently tend to be cuts, do not rigidly maintain previous SPP shares of TOA. The platform sponsors receive the largest shares of TOA (to cover major weapon systems procurement and support) and are therefore generally expected to absorb larger-than-proportional cuts.

The SPP fiscal guidance is derived by N80/OP-80 and communicated to individual resource sponsors through memoranda. For the platform sponsors, the guidance specifies separate subtotals for the Shipbuilding and Conversion and Aircraft Procurement appropriations; other subtotal guidance may also be issued at N80/OP-80 discretion. The total blue-dollar TOA is distributed to SPPs in internal fiscal guidance.

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[51] Under the reorganization of 1992, Training was transferred from N1/OP-01 to N7, Director, Training and Doctrine, which also absorbed the former responsibilities of Chief of Naval Education and Training.

Preparing and Presenting SPPs. Inputs to resource sponsors for SPP development come from a variety of sources. The platform sponsors obtain basic information from the systems commands; with respect to new ships, for example, NAVSEA—or a Program Executive Officer—supplies data on construction requirements, anticipated development and procurement costs, and logistics support requirements. Various working groups also assist the sponsors in programming and pricing support resources; in the POM92 cycle, for example, an MPT working group developed manpower and training guidance for structuring and pricing manpower programs, and another working group assisted with Base Operating Support (BOS). And, of course, the Baseline Assessments described earlier in this chapter may also provide costing information.

As in Navy Program Planning, resource sponsors also receive inputs from claimants. Claimants and resource sponsors have always interacted regularly during SPP development, but the process has become much more formalized. Claimants may now formally submit up to 10 issues—requests for specific program enhancements—and although they are supposed to recommend offsets within their own claimancy, they never do in practice. Resource sponsors are required to respond explicitly to these requests in their SPPs.

In preparing the SPPs, sponsors must adjust programs to bring them into compliance with fiscal, end-strength, and other resource constraints. Compliance means that offsets must be found within the SPP area for any desired increases in resources for new or expanded initiatives. To some extent, the offsets are provided by "broken" programs, such as cancellations or delays in development or testing (e.g., as in the case of the A-12 system). In other cases, however, the process of developing and presenting offsets supplies information to Navy leadership about basic alternatives, such as procurement versus modernization of ships' weapon systems.

The SPPs are submitted in three parts: (1) recommended changes to the Navy's program database system submitted by the resource sponsor to produce an updated FYDP for N80/OP-80 analysts to review; (2) an SPP presentation, consisting of a briefing to the PDRC and including a detailed description of the sponsor program; and (3) an SPP document, which highlights changes in the program

area since the previous FYDP and responds explicitly to CINC and claimant issues.

Post-SPP Assessments and Reviews. Post-SPP assessments (also called program assessments) typically examine SPPs from the same perspectives as the baseline assessments performed earlier in the PPBS cycle. For example, most of the assessments for POM92 covered the areas and were performed by the sponsors listed above in Table 3.2.

The same OPNAV office may be dual-hatted as both a resource sponsor and an assessment sponsor in a similar program area, but would apply somewhat different perspectives to the two roles. For example, the DCNO for Manpower and Personnel (N1, formerly OP-01, DCNO for Manpower, Personnel, and Training) and Director, Training and Doctrine (N7), may be asked to assess a number of manpower training programs for which they are also resource sponsors, but assessment responsibilities may more broadly include manpower in the fleets for whom N86/OP-03 or the N88/OP-05 may be the resource sponsor.

Although the appropriations breakdown of the SPPs is far less important in developing the POM than in subsequent budgeting, reviews by appropriation sponsors can help prevent errors and highlight matters that might raise budgeting issues. The appropriation sponsors for POM92 are listed in Table 3.5.

After the SPPs are presented to the PDRC and are reviewed by assessment and appropriation sponsors, N80/OP-80 may issue directives requiring the resource sponsor to revise the SPP. Such directives are known informally as "ZOWS." The resource sponsor enters them and other adjustments to the central program database to produce a preliminary version of the Navy POM.

Marine Corps Program Development

The Marine Corps develops both initiatives for programs funded through Navy blue-dollar appropriations and a green-dollar POM and RDT&E program for presentation to the DPSB and SECNAV. Thus, the Marine Corps actively participates in both the Navy and Marine Corps Program Development phases.

Table 3.5

Navy Appropriation Sponsors for POM92

Appropriation	Sponsor
Military Personnel, Navy (MPN)	OP-01 (N1)
Military Personnel, Marine Corps (MPMC)	CMC
Reserve Personnel, Navy (RPN)	OP-095 (N095)
Reserve Personnel, Marine Corps (RPMC)	CMC
Operations and Maintenance, Navy (OMN)	OP-82 (N82)
Operations and Maintenance, Marine Corps (OMMC)	CMC
Operations and Maintenance, Naval Reserve (OMNR)	OP-095 (N095)
Operations and Maintenance, Marine Corps Reserve (OMMCR)	CMC
Aircraft Procurement, Navy (APN)	OP-05 (N88)
Weapons Procurement, Navy (WPN)	OP-03 (N86)
Shipbuilding and Conversion, Navy (SCN)	OP-03 (N86)
Other Procurement, Navy (OPN)	OP-82 (N82)
Procurement, Marine Corps (PMC)	CMC
Research, Development, Test, and Evaluation, Navy (RDT&EN)	OP-098 (N091)
Military Construction, Navy (MCON)	OP-04 (N4)
Military Construction, Naval Reserve (MCONR)	OP-095 (N095)
Family Housing, Navy and Marine Corps (FHN&MC)	OP-04 (N4)

SOURCE: Unpublished briefing chart from the DONPIC PPBS Training Course, March 1991.

NOTES: N80/OP-80 acts as cognizant officer for POM coordination; new names under 1992 reorganization are in parentheses.

The majority of blue-in-support-of-green programs support Marine Corps aviation requirements, but other examples include amphibious ships and landing craft, and even some other assets (e.g., communications gear) used directly by the Marine Corps. These initiatives are programmed through a Navy resource sponsor; for example, while the Marine DCS for Aviation is responsible for advocating that Marine Corps aviation-related programming objectives be included in N88/OP-05's *Sponsor Program Proposal*, it is N88/OP-5 that propagates them in its SPP. Thus, the Marine Corps acts as one of the claimants providing input to Navy resource sponsor SPPs for uses of blue-dollar funds and, as such, is present at all Navy programming decisionmaking committees.

For internal green-dollar programming, however, the Marine Corps does not divide TOA along resource sponsorship lines. Instead, the Marine Corps allocates a portion of green-dollar TOA—known as the

core—among *appropriations*. Then the Marine Corps solicits and selects initiatives for using available funds above the core, and finally merges core programs and approved initiatives into a consolidated green-dollar POM. The following discussion describes this green-dollar process.

Developing the Core. As a technique to support resource decision-making, the core has two distinct purposes. One is to protect current-capability programs—i.e., procurement and other ongoing programs initiated during earlier programming cycles—and other high-priority programs; the other purpose is to promote reexamination and prioritization of new initiatives or lower-priority programs. In times of increasing resources, core levels can normally be set high enough to maintain previously programmed resourcing. During periods of declining resources, the size of the core is only large enough to cover selected programs that are viewed as most critical to Marine Corps capabilities. In either environment, however, the core is intended primarily to support existing program efforts, promoting competition among new initiatives for funds above the core.

Basic guidance for determining the core, including fiscal guidance, of course, comes from planning phase activities. It also includes basic decisions about Marine Corps force structure (number and type of combat units)[52] and procurement and other plans reflected in the Marine Corps *Summary Warfare Assessment* and other planning phase documents. In concert with the Mid-POM Review, the Marine Corps also updates the data from its previous FYDP submission as a revised baseline for POM development.

Core levels are set for each Marine Corps appropriation and the portions of Navy appropriations allocated to the Marine Corps for programming. Appropriation sponsors, as listed in Table 3.6,

[52]MCCDC provides the baseline FMF military force structure, and the DCS (R&P) combines that with non-FMF structure as guidance for POM development. Although force-structure decisions normally occur early in POM development, this pattern has not been followed lately because of a lack of timely and definitive defense guidance. Consequently, while awaiting more definitive guidance, DCS (R&P) has established alternative cases that could be used to guide POM development.

Table 3.6

Marine Corps Appropriation Sponsors

Appropriation	Sponsor
Military Personnel, Marine Corps (MPMC)	DCS (M&RA)
Reserve Personnel, Marine Corps (RPMC)	DCS (M&RA)
Operations and Maintenance, Marine Corps (OMMC)	DCS (I&L)
Operations and Maintenance, Marine Corps Reserve (OMMCR)	DCS (M&RA)
Procurement, Marine Corps (PMC)	MARCOR-SYSCOM
Military Construction, Navy (MCON)	DCS (I&L)
Military Construction, Navy Reserve (MCONR)	DCS (I&L)
Family Housing, Navy and Marine Corps (FHN&MC)	DCS (I&L)
RDT&E[a]	MARCOR-SYSCOM

SOURCE: U.S. Marine Corps, "Marine Corps Planning and Programming Manual," unpublished draft, dated 1989.

[a]Not considered to be Marine Corps green dollars.

help establish the core levels by identifying their current-capability programs, and the DCS (R&P) reviews and validates those determinations.

The way the core level is developed differs somewhat for various appropriations, as follows:

- *Military and Reserve Personnel.* Approximately 70 percent of Marine Corps green dollars are devoted to military personnel and related manpower costs, and there is relatively little flexibility to modify this portion of the budget once end-strength is determined. Therefore, military manpower core levels are set early in program development, using a cost estimate from FDMC for an end-strength level approved by the commandant. That cost estimate specifies both the Military Personnel, Marine Corps, for active personnel, and the Reserve Personnel, Marine Corps, core funding levels.
- *Operations and Maintenance.* The cores for active and reserve O&M (O&MMC and O&MMCR, respectively) are based on a level of effort for supporting end-strength and current-capability procurement items, but with an explicit intent to set the cores low enough to cause reexamination of discretionary items. The ap-

propriation sponsor splits the core and distributes it to the two FMF commands, requesting input on how the core, as well as above-core funds, would be used.

- *Procurement.* MARCORSYSCOM reviews the continuing funding needs of programs approved in previous budgets (i.e., materiel already in production and quantities previously programmed). The review covers both FMF tactical materiel and equipment for bases and stations.
- *Allocated Appropriations* (i.e., shares of Military Construction, Family Housing, and Stock Fund appropriations subject to Marine Corps programming). These cores are generally set after the cores for other appropriations; they are most heavily influenced by the extent to which green-dollar TOA is growing or shrinking.

Developing Initiatives Above the Core. Initiatives for above-core funding come from a variety of sources, as follows:

- *Operations and Maintenance.* As we indicated above, O&M program development is decentralized, with most information submitted by the FMFs. The majority of O&M money for operating forces is for moving people and equipment (e.g., to training sites), and for property and equipment maintenance. The FMFs estimate their needs in these areas using methods and data sources that are not visible to Marine Corps Headquarters. However, some O&M programs are developed centrally; this is true mainly for O&M support in training schools, for which the initiatives are developed by the Training and Education Command at Quantico, Virginia.
- *Military and Reserve Personnel.* Military manpower costs depend primarily on end-strength and overall personnel management policy (accessions, promotions, etc.); therefore, most of the MPMC and RPMC appropriations are included in core. However, some room usually remains for adjustment, and building the POM calls for determining how end-strength will be used. That determination is made through a process called Structure Program Development, where *structure* refers to the sum of all the Tables of Organization of the Marine Corps, including units in inactive or cadre status. The structure development process

begins with a POM serial published by DCS (R&P) that provides the structure baseline and solicits active force-structure initiatives; the DCS (M&RA) issues a similar call for initiatives on reserve manpower.[53] The commanding general of MCCDC submits both FMF initiatives and non-FMF initiatives for centralized training and education, whereas headquarters staff agencies submit non-FMF manpower initiatives within their area of staff supervision.

- *Allocated Appropriations.* Initiatives in the allocated appropriations areas, primarily for Military Construction and Family Housing, are requested from field commands by a POM serial issued by DCS (R&P) in coordination with the DCS (I&L). However, a good deal of centralized analysis of requirements and costs occurs for these appropriations.
- *Procurement.* Since 1988, the platform sponsorship function for Fleet Marine Forces has been centralized in MCCDC, which prioritizes initiatives for new acquisitions across all platforms, including those funded by blue as well as green dollars. Meanwhile, non-FMF acquisition initiatives are submitted to the DCS for Requirements and Programs, which coordinates the review and merging of FMF and non-FMF initiatives for headquarters review. MARCORSYSCOM prepares and costs the detailed initiatives for both types of procurement programs.

Although not part of green-dollar appropriations, RDT&E initiatives are developed and evaluated using processes like those for procurement initiatives. MARCORSYSCOM prepares the initiatives in coordination with MCCDC and other headquarters agencies, and MCCDC takes the lead in prioritization.

Selecting Among Green-Dollar Initiatives. The general process for selecting among initiatives uses a qualitative decision method developed by Decisions and Designs, Inc. (DDI). In that method, initiatives are grouped by type, ranked in terms of several categories of benefit, then combined into an overall ranking based on a DDI-

[53]The process for determining the use of civilian personnel is similar. However, civilian-personnel costs are covered primarily by O&M appropriations, so the DCS (I&L) manages the call for initiatives and the initiatives are proposed primarily by the major field commands.

developed scaling procedure. The idea is that available (above-core) funding will be used to cover initiatives in their overall rank order until funds are exhausted. The process is iterative, and options can change rankings if preliminary outcomes appear unsatisfactory. This same method is used repeatedly at several levels of review.

Program Evaluation Groups (PEGs)—temporary ad hoc committees[54] to help assess the relative benefit of individual program initiatives within prescribed categories—conduct the first level of review. MCCDC convenes a PEG to rank FMF materiel acquisition and force-structure initiatives, and other headquarters offices establish PEGs to rank other initiatives. For example, the DCS (I&L) convenes a PEG for facilities construction initiatives.

The next level of review is the POM Working Group (PWG), which hears briefings on the core and proposed initiatives. The PWG then integrates the various PEGs' evaluations into a recommended six-year program—an initial version of the Marine Corps green-dollar POM. The PWG also recommends a strategy for quickly adjusting—up or down—the total program to changes in fiscal guidance when the program moves into the budgeting phase.

The PWG's recommendations pass to the Program Coordination Group (PCG), and finally to the Assistant Commandant's Committee. These committees are described in the "Review and Decisionmaking Committees" subsection of this chapter.

Building the USMC POM Submission. Building the POM submission essentially entails translating all the approved core programs and initiatives into FYDP format with finalized cost estimates. This activity is coordinated by the Fiscal Director of the Marine Corps (FDMC),[55] using data supplied by appropriations sponsors, as follows:

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[54]Field commands are generally represented in these groups. The relatively small number of Marine Corps major commands (2) and major installations (9 to 10) makes it relatively easy for the Marines to call in all their commanders to meet on the POM and other issues.

[55]The FDMC assigns a member to the PWG and PCG to serve as the action officer for compiling Marine Corps submissions to the Navy Headquarters Programming System.

- *Military Personnel.* DCS (M&RA) supplies the POM manpower plan for active, reserve, and civilian personnel. FDMC costs out the MPMC and RPMC appropriations according to approved pay and benefits rates. FDMC also furnishes the DONPIC with the average military pay rates used for the updates of the FYDP.
- *Procurement.* MARCORSYSCOM furnishes the PMC TOA display, and also submits required DON POM Procurement Annex data to DCS (R&P) for transmission to the appropriate Navy staff. With respect to aviation procurement, the DCS for Aviation furnishes N88/OP-05 with updated copies of Marine Corps aircraft planning objectives.
- *Operations and Maintenance* and *Allocated Appropriations.* DCS (I&L) provides the TOA display for O&MMC, Military Construction, and Family Housing; the DCS (M&RA) provides the display for O&MMCR.

FINAL POM PREPARATION ("END GAME")

The End Game consists of the final Navy decisionmaking necessary to develop the overall POM. This phase begins when N80/OP-80 combines the Navy and Marine Corps submissions into a tentative Navy Program—a draft of the POM—and presents it to the Resources and Requirements Review Board.[56] Although both the CNO and DON Program Strategy Board can and do hear presentations earlier in the process, they (especially the DPSB) and SECNAV resolve outstanding issues during this phase.

This final programming phase also clarifies many technical details necessary to complete the POM. For example, the systems commands or associated PEOs will supply final revisions to cost estimates for procurement programs, and resource sponsors will make sure their program data comply with OSD instructions for POM preparation.[57]

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[56]It may also be presented to the Navy Staff Executive Steering Committee; at the time of writing, final decisions on this question had not yet been made.

[57]In addition, the DON finalizes its *Total Force Report* to Congress during the End-Game period. This is an annual report newly required of all services to address the

When compiled and approved by the SECNAV, the POM is forwarded to OSD in the form of both a written document and the automated FYDP submission. The FYDP projects annual TOA by appropriation and program element, and annual forces by resource identification code (RIC); RICs identify Navy surface ships and submarines by class, Navy and Marine Corps aircraft by TMS, and Marine Corps battalions and companies.

BUDGETING

The PPBS budgeting phase is generally deemed to start with the promulgation of the *Program Decision Memorandum*, the Secretary of Defense's formal response to the services' POM submissions. The PDM, along with OSD budgeting guidance, provides the basic information the services need to translate the first two years of the POM into a biennial budget. This information leads, first, to a Budget Estimate Submission that is evaluated in OSD, resulting in written Program Budget Decisions signed by the Secretary of Defense. Then a revised submission is prepared for the President's Budget submission to Congress. The process leading from the PDM to the PB lasts approximately six months and completes the biennial PPBS cycle.

Within the DON, the transition from programming to budgeting occasions a significant change in organizational responsibilities. General process oversight, as well as control over the centralized program database, passes from N80/OP-80 to NAVCOMPT.[58] Furthermore, responsibility for submitting detailed cost data shifts from resource sponsors to claimants.

At the start of the budgeting phase, NAVCOMPT issues a budget call to Budget-Submitting Organizations—i.e., to claimants. Based on their RADs, reports from the latest POM and other guidance issued by NAVCOMPT, the BSOs convert approved programs into detailed

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relationship between force structure and active and reserve manpower plans. The report is prepared by OP-06, newly renamed as N3/N5.

[58]The Navy Comptroller, a civilian as required by the Goldwater-Nichols Act, is also the Assistant Secretary of the Navy for Financial Management. Budgeting guidance appears in U.S. Department of the Navy, NAVCOMPT Instruction 7102.2A (1985) and is supplemented by the NAVCOMPT Notice 7111 Series (additional or updated details), and the NAVCOMPT Notice 7110 Series (specific schedules and related guidance).

estimates by appropriation category, apply the latest contractual and pricing information, and adjust the time phasing of obligations as needed. Table 3.7 lists Navy and Marine Corps BSOs, which include the systems commands, the naval component commands under the unified CINCs, and the Marine Corps; it also indicates the principal appropriations budgeted by each BSO.

Claimant submissions are reviewed by NAVCOMPT, which not only analyzes and marks up the individual submissions, but also compiles and reviews totals by appropriation and budget activity. As the budgeting phase progresses, NAVCOMPT also recommends or makes

Table 3.7

Department of the Navy Budget-Submitting Organizations

Budget-Submitting Organization	Principal Appropriations
CINC, U.S. Atlantic Fleet	OMN/OMNR/OPN
CINC, U.S. Pacific Fleet	OMN/OMNR/OPN
CINC, U.S. Naval Forces, Europe	OMN/OPN
Chief of Naval Education & Training[a]	RPN/O&MN/OMN
Naval Oceanographic Command	OMN/OPN
Commander, Naval Reserve Force	RPN/OMNR/OPN
Chief of Naval Personnel (CHNAVPERS)	MPN/RPN/OMN/OMNR/OPN
Naval Medical Command[b]	RPN/OMN/OPN
Naval Telecommunications Command	OMN/OPN
Naval Intelligence Command	OMN/OPN
Naval Security Group Command	OMN
Asst. for Admin., Office of the Under Secretary	OMN/OPN
CNO (OP-09BF)	OMN/OMNR/OPN
NAVAIR	OMN/OMNR/APN/WPN/OPN
NAVSEA	OMN/OMNR/WPN/SCN/OPN
SPAWAR	OMN/OMNR/OPN
NAVSUP	OMN/OPN/NSF
NAVFAC	OMN/OMNR/OPN/MCN/MCNR/PH
Strategic Systems Project Office (SSPO)	OMN/WPN
Office of the Chief of Naval Research (OCNR)	RDT&EN
Headquarters, Marine Corps	MPMC/RPMC/OMMC/OMMCR/PMC

SOURCE: Unpublished briefing chart, DONPIC PPBS Training Course, dated March 1991.

[a]Assumed to have become the responsibility of N7, Director, Training and Doctrine, under 1992 reorganization.

[b]Prior to 1992 reorganization, redesignated the Bureau of Naval Medicine.

adjustments based on its own analyses and the results of SECNAV, OSD, and Office of Management and Budget reviews.[59]

Within this general budget submission and review process, some specific features are noteworthy for the cost analyst:

- Procurement budgeting reflects primarily detailed data from contracts and contractor reports. The bulk of procurement budgeting is done by the systems commands and MARCORSYSCOM, but a wide range of Navy claimants also budget Other Procurement (OPN) funds for such items as communications, medical, and automation equipment.
- Military personnel budgeting is largely centralized and performed by the same organizations that project POM costs. Personnel pay and benefit costs heavily depend on end-strengths and personnel management policies (e.g., recruiting, promotions) that can be projected only in the aggregate. Therefore, centralized models are used by N1/OP-01 to budget MPN and RPN for reserves on full-time active duty; by N095/OP-095 to budget the remainder of RPN (i.e., SELRES costs); and by the Marine Corps Financial Director to budget MPMC and RPMC. Claimants submit budget-supporting data only for specific personnel cost elements, such as student stipends for the Reserve Officer Training Corps (ROTC), that can be associated with particular claimant activities.
- Included in the Operations and Maintenance accounts for the major operating commands are funds for air and sea operations, called "optempo costs."[60] Although CINCLANTFLT and CINCPACFLT submit optempo budgets, there are also centralized models for Navy optempo costing. N88/OP-05 uses a programming-and-budgeting model to validate flying-cost budgets based

[59]From the DON's viewpoint, the external budget review process, with its many players and significant opportunities for intervention, can easily upstage other aspects of the budgeting phase. Nonetheless, external reviews warrant little attention in this study, given its focus on costing exercises.

[60]Optempo costs cover fuel, replenishment parts, billings for centralized maintenance, and "other OPTAR" (i.e., consumables such as paint and ships' janitorial supplies). Other O&M costs cover base operations, such as utilities and real-property maintenance.

on aircrew training requirements and aircraft operating cost experience. For ship operations, N82/OP-82 uses its own detailed ship operations model to account for the effects of deployment and overhaul schedules. However, there are no centralized models for projecting FMF ground operations costs.

FYDP budget updates cover the current and prior years as well as the two new budget years. Supporting data include major procurement production schedules and prices, lead times to equipment delivery, peacetime operating requirements, and personnel grade structure and training requirements.

EXECUTION

Budgeting leads to execution through the federal apportionment, allocation, and allotment process. *Apportionment* is the determination by the Office of Management and Budget (OMB) that a specific amount of funds may be obligated in a specific time period under a specific appropriation. This determination is fairly simple for Military Personnel and O&M appropriations because, by law, they must be obligated within the appropriation year; in contrast, Procurement and Military Construction appropriations may be obligated over the following three- to five-year period. NAVCOMPT submits an apportionment schedule to OMB shortly after Congress approves the federal budget.

Following apportionment, allocations, suballocations, and/or allotments distribute responsibility for budget execution to administering offices—the BSOs—and to the budget holders and fund administrators who will actually acquire and manage the funded resources. For example, systems commands and MARCORSYSCOM execute the bulk of RDT&E and procurement funds; the Bureau of Naval Personnel executes military and reserve personnel funds; and NAVFAC executes military construction funds.

Execution under the O&M appropriations has three special features. First, the Navy does not allocate all these funds to administering offices at the beginning of the year; some O&M funds are held in reserve to cover unanticipated events, such as deployment schedule changes resulting from changing international conditions. Second, O&M allocations and suballocations depend on policies that can vary

over time and from one claimant to another.[61] Third, O&M appropriations offer some flexibility to move funds among budget activities without prior approval; for example, Navy operating commanders can shift funds from flying-hour execution to base operating support.

A number of Navy databases contain information on actual budget execution. NAVCOMPT receives these data and uses them for audit studies and, in some cases, to support analysis datafiles, such as the VAMOSC-SHIPS (Visibility and Maintenance of Operating and Support Costs—Ships) system.

HIGHLIGHTS FOR THE COST ANALYST

Recall that we began this chapter on the DON's participation in PPBS by noting that the Navy and Marine Corps face important challenges in planning, programming, and budgeting in a changing environment. The Navy faces significant fleet reductions by 1995, many DON installations are targeted for closure during the next decade,[62] and the Navy may continue to revise its notional force elements (e.g., the size and composition of a notional carrier air wing) to accommodate reduced budget expectations, delays in weapon deliveries, and altered mission requirements.[63] Similarly, the Marine Corps is already experiencing a multiyear downward trend in procurement, as Figure 3.7 indicates. The Department of the Navy has not been, and will not be, immune to major swings in force-size objectives and reorientation of some of its missions.

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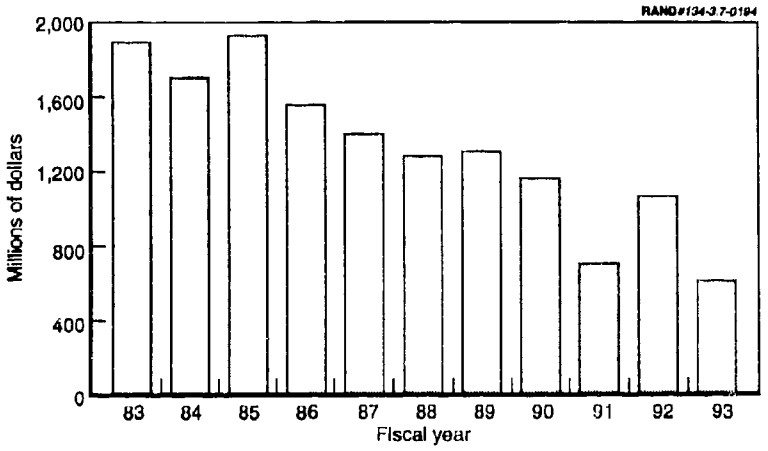
[61]Examples are as follows: The Marine Corps suballocates O&M funds to installations separately from major operating commands, whereas the Navy does not (i.e., FMF operating budgets do not cover base operations, but component command operating budgets do); Navy component commands are billed for depot-level maintenance, but Marine Corps FMFs are not; the Marine Corps used to allocate funds to base commanders for operating the schools on their bases, but now school operating costs are charged to the Commanding General at Quantico.

[62]For example, prior to the 1993 deliberations of the third Base Closure and Realignment Commission, the Department of the Navy had 154 installations in CONUS and recommended the closure of an additional 23 installations during the 1993 round.

[63]In 1993, the notional air wing consisted of a minimum of 50 fighter and/or attack aircraft of just three squadrons (36 F-18s and 14 F-14s) and supporting aircraft, including four E-2Cs, four EA-6Bs, and six S-3 and five H-60 helicopters.



SOURCE: Based on unpublished briefing chart supplied by Marine Corps interviewees.

NOTE: The data reflect past procurement funding experience and future procurement projections as of FY 91.

Figure 3.7—Trend in Marine Corps Procurement TOA, FY 83–FY 93

In the context of costing such changes, perhaps the most salient aspect of the DON's resourcing approach is its limited reliance on predictive models or factors. Instead, the process uses subject-matter experts; baselines drawn from prior decision cycles; cross-cutting reviews that integrate across platforms, programs, or organizational structures; layered decisionmaking committees; and detailed program-by-program competition for limited funds. To be sure, DON programmers and budgeteers use costing databases and automated techniques for resource analysis, but these tools are often developed on an ad hoc basis to serve special needs and users. And models, databases, and methodologies are not widely shared.[64]

[64]As indicated earlier, however, with the availability of macrolevel costing models, this is becoming less true than it was before.

More specific examples of the DON approach to evaluating resourcing decisions are as follows:

- Through the *White Paper Revision* and the assessments process, the DON develops overarching maritime policy and establishes guidance for overall force composition early in a PPBS cycle. The assessment structure separately considers warfare, warfare support, and general support task areas; costing for the warfare areas is restricted largely to investment.
- Given the magnitude of the changes to the force structure, cost factors and costing models designed to assist the cost analyst in assessing changes at the margin may provide somewhat misleading results: reductions in or consolidation of basing and other Shore Establishment facilities, for example, may in fact be quite "lumpy," i.e., reductions take place in large, aggregated increments.
- During POM development in the past, Navy resource programming was centralized in the hands of a few resource sponsors rather than the far more numerous claimants. Consequently, many important trade-offs, such as between acquisition and maintenance or modification of weapon systems, were internalized within a sponsorship area, with trade-offs across resource sponsorship areas accomplished only through the End Game review process. With the recent reorganization, which was reportedly intended to shift decision responsibilities in favor of N8 over the platform sponsors, cost analysts may begin to see more trade-offs across platforms.
- Resource sponsors (here defined broadly to include the Marine Corps) can access a variety of methods and databases, including estimates prepared by systems commands and baseline assessment sponsors, to help project some of their program's resource needs. But much of SPPs' development hinges on case-specific estimates supplied by claimants or developed from ad hoc queries rather than generalized costing tools—especially in the Marine Corps, where claimants are a key source of new initiatives for program development.
- Although some recently developed models have begun to be used for centralized analysis of force support costs, traditionally

there have been no general, centralized models that associate a full range of operating and suppo ' costs with the various force packages (e.g., carrier battle groups or surface action groups) that constitute the DON's overall force structure.

- In moving from POM development to budgeting, proponents for DON programs shift from resource sponsors to claimants, and responsibility for coordination and initial issue resolution passes from N81/OP-81 to NAVCOMPT. The reassignment of responsibilities is significant because key resourcing decisions can (and increasingly do) occur during budget preparation. It is not simply a matter of translating the first two years of the preceding POM into budgetary line-item format, but also updating resource and cost estimates and incorporating OSD and legislative guidance. External intervention as well as unanticipated circumstances (e.g., Desert Shield and Desert Storm) often require major changes to be undertaken in a very short time frame and to be managed by budgeteers.

Chapter Four

DON RESEARCH, DEVELOPMENT, AND ACQUISITION

Research and development projects and procurement contracts are among the most prominent programs proposed and budgeted through the Planning, Programming, and Budgeting System. Research, Development, and Acquisition (RDA) is a systematic process for providing military forces with new weapons, equipment, munitions, systems, and support items. The Navy explicitly grounds its RDA activities within the PPBS structure and views PPBS as the competitive environment within which RDA projects must be justified. OSD and Department of the Navy aspects of the process are well documented in other sources.[1] In this chapter, we summarize the process and its participating organizations, emphasizing cost-related terminology, responsibilities, and methods. Much of the costing that is done for RDA decisionmaking is performed by and reported to the same organizations as for PPBS decisionmaking. Consequently, much of this chapter may be viewed as simply amplifying on the PPBS as it pertains to important decisions about naval technology and materiel.

However, the RDA decision process also has distinctive features. Whereas PPBS decisionmaking proceeds on a recurring, calendar-linked cycle, the evolution from research on new technology to system production and acquisition proceeds on a schedule of mile-

[1]In particular, see U.S. Department of the Navy's ASN(RD&A) *Acquisition Planning Guide* (1992a); the DON *RDT&E/Acquisition Management Guide* (1989); and the DON Secretary of the Navy Instruction (SECNAVINST) 5000.2A (1992b), a 5000-series document that describes the new Navy RDT&E process and implements the 5000-series DoD instruction on defense acquisition management. This chapter reflects our understanding of the major changes implied by the final draft of the instruction.

stones unique to every project; hence, RDA involves a sequence of milestone decisions independent of the PPBS cycle. Furthermore, to support that sequence of decisions, both OSD and the DON have established RDA-specific organizational responsibilities, reporting relationships, and oversight committees. It is these special features of the RDA process—particularly as manifested within the DON—that receive most attention in this chapter.

PLAYERS, ROLES, AND RESPONSIBILITIES

Major acquisition programs (i.e., those exceeding specified cost thresholds) are subject to special oversight at the OSD level:

- The Under Secretary of Defense for Acquisition (USD[A]) is directly responsible for major program oversight as the designated Defense Acquisition Executive (DAE).
- A special forum, the Defense Acquisition Board (DAB), reviews major acquisitions separately and on a different schedule from that of the Defense Resources Board (DRB).
- An OSD-level committee known as the Cost Analysis Improvement Group (CAIG) establishes and updates guidance on how costing is to be performed and presented for DAB review.

The role of this DoD oversight in RDA management and costing is described throughout this chapter.

Within the DON, the offices and organizations that play central roles in the RDA process are also key players in DON planning, programming, and budgeting, as can be seen from Figure 4.1. RDA activities are guided by the DON's PPBS appraisal process, programmed by resource sponsors, and reviewed by appropriation sponsors, N-8/OP-08, and the Navy's various review boards, as we described in Chapter Three. In the past, within OPNAV and HQMC, particular individuals have also been identified as program sponsors, acting as the agents for the CNO or commandant with respect to key RDA activities.[2] However, as Figure 4.1 illustrates for Naval Air, RDA also imposes unique responsibilities and additional reporting relationships:

[2]We have uncovered no information of a change.

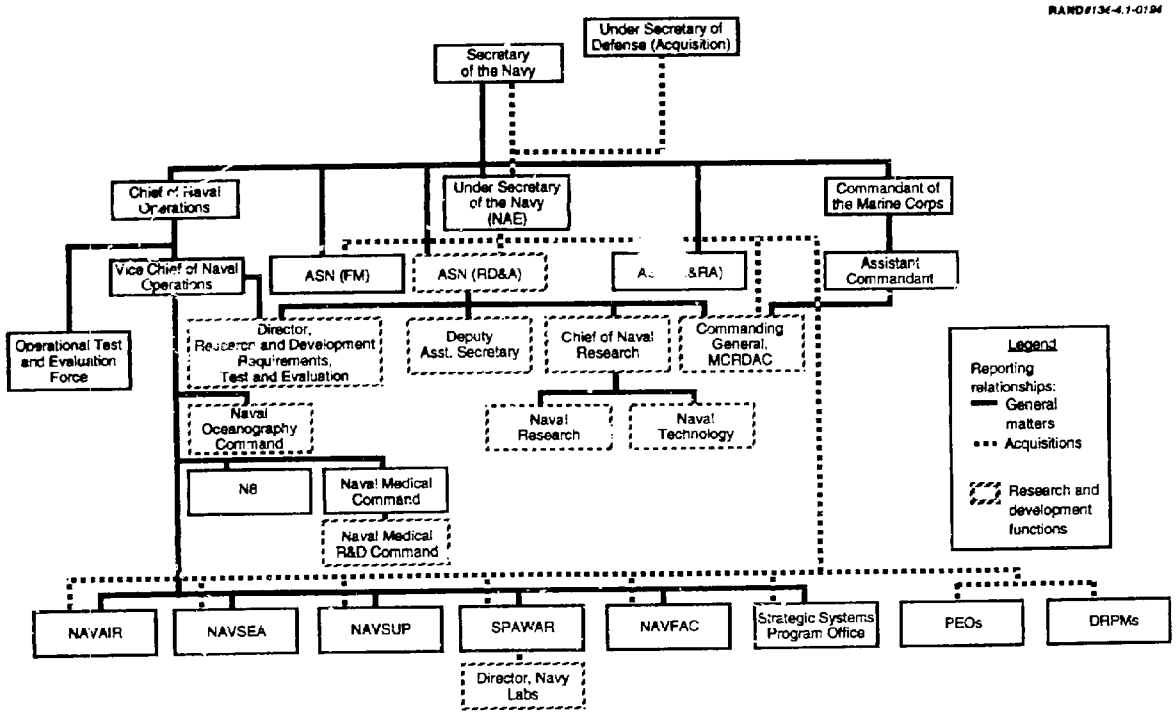


Figure 4.1—DON Organization for Research, Development, and Acquisition

- Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN[RDA]). The ASN(RDA) is responsible to the SECNAV for Navy and Marine Corps RDT&E and acquisition policies, practices, procedures, organization, and control. Under the Goldwater-Nichols Act, acquisition executives were created within the services to ensure better coordination of RDT&E; in the Navy, ASN(RDA) is the designated Navy Acquisition Executive (NAE)[3] and also manages the RDT&EN appropriation and oversees the Office of Naval Research (ONR).[4]
- The Principal Deputy Assistant Secretary of the Navy, ASN(RDA) (PDASN). The various Deputy Assistant Secretaries of the Navy (DASNs) in ASN(RDA), who are responsible for RDA for the various platform types, report to the PDASN.[5] In the programmatic world, the PDASN is also a member of the Program Policy Board (PPB).
- The Chief of Naval Operations (CNO) and Commandant, Marine Corps (CMC). The RDA responsibilities of the CNO and CMC are wide-ranging and include identifying critical system characteristics in the generation of requirements, developing and accrediting scenarios for use in Cost and Operational Effectiveness Analyses (COEAs), providing affordability assessments, and as described in earlier chapters, planning, programming, and budgeting for Navy RDA.
- The Chief of Naval Research. The CNR is responsible for policy and guidance in planning and implementing research and exploratory development—the Navy's technical base activities—the base of R&D that supports development of OP-1 concepts and systems.
- Director of Navy Test & Evaluation & Technology Requirements (N091). N091 establishes and implements policy and procedures

[3]Corresponding to the OSD-level Defense Acquisition Executive, the NAE is responsible for Navy-wide acquisition management, planning, and control.

[4]This office combines the responsibilities previously assigned to two ASNs, one for Research, Engineering, and Systems (RE&S) and another for Shipbuilding and Logistics (S&L).

[5]For example, there are DASNs for ASW, Air, and C^{4}I/EW/Space programs.

for the conduct of test and evaluation for new Navy and Marine Corps systems, and is the focal point for resolving testing and evaluation issues with OSD. N091 also serves as a resource sponsor for selected RDT&E field activities and programs; manages investment planning for Advanced Technology Development (6.3A), including the Advanced Technology Demonstration process; administers test and evaluation master plans (TEMPs); and coordinates independent testing with the user community. N091 also serves as a member of Navy Oversight Boards (see below).

- Operational Test and Evaluation Force. OPTEVFOR is responsible for operational testing and evaluation of Navy weapon systems, ships, aircraft, and equipment, including procedures and tactics. OPTEVFOR is independent of the systems commands. It provides the results of operational test and evaluation to D/AB production decision reviews and to other reviews as directed by the CNO.
- Director, Marine Corps Operational Test and Evaluation Activity. Like OPTEVFOR, MCOTEA is an operational testing activity independent of MARCORSYSCOM and the Navy systems commands. The Director of MCOTEA reports directly to the Commandant of the Marine Corps.
- Director, Naval Center for Cost Analysis (NCA). The Director, NCA, serves as the DON member of the OSD Cost Analysis Improvement Group and as the coordinator of DON cost activities with that group. Under the direction of ASN(FM), and in coordination with ASN(RD&A), NCA is responsible for a variety of DON cost-analysis-related activities, including administering the Contractor Cost Data Reporting (CCDR) program, conducting independent contractor financial analysis and contract performance measurement in support of the cost estimating process, and managing the DON VAMOSC program.

Under the leadership of the foregoing officials, key RDA planning, resourcing, and implementation functions are carried out by the systems commands, the Strategic Systems Program Office (SSPO), Marine Corps Systems Command (MARCORSYSCOM), and the Program Executive Officers (PEOs) and Direct-Reporting Program Managers (DRPMs). In this context, SPAWAR has the unique responsibility for DON-wide requirements integration, and serves as a

general clearinghouse for initial specification and assignment of development projects to the various systems commands, the SSPO, and MARCORSYSCOM.

Under a management system recommended by the Packard Commission, which did a review of acquisition policy in the 1980s, PEOs are held responsible for major acquisition programs (i.e., those major acquisition programs subject to DAB review at the OSD level), and report directly to the NAE on those programs.[6] As can be seen from Figure 4.2, the commanders of the systems commands, the PEOs, the DRPMs, and MARCORSYSCOM and the Director of the SSPO are all responsible for major acquisition programs and are considered to be DON PEOs. Similarly, DRPMs report directly to the NAE on designated RDA programs. The range of RDA programs managed by each of the individual systems commands is shown in Table 4.1.

Individual RDT&E or acquisition programs are directly managed and executed by Acquisition Program Managers (APMs), who are either PEOs, DRPMs, or program managers (PMs), depending primarily on the size of the program:

- Program Executive Officer and Direct Reporting Program Manager. PEOs and DRPMs are responsible for major programs, and report directly to the NAE, ASN(RD&A). These programs are managed either by senior civilians or by a flag officer (admiral).[7]
- Program Manager (PM). PMs are responsible for smaller programs and, rather than reporting to the NAE, typically are found under the systems commands. A Marine colonel or Navy captain normally holds the position, but a PM may also be a civilian.

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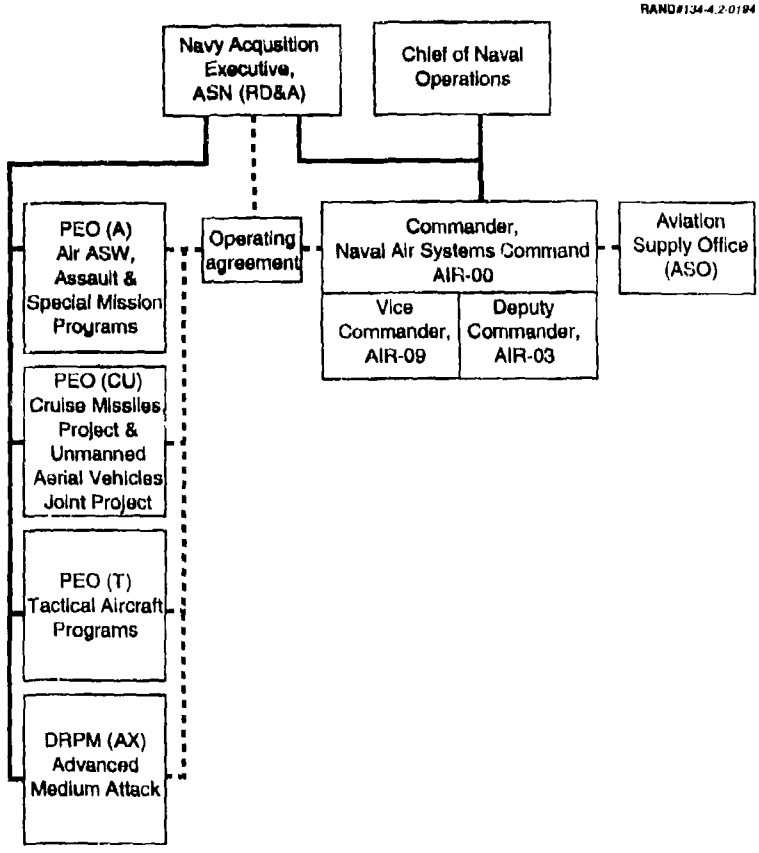
[6] A program is *major* if its expected costs (in FY 80 dollars) exceed $200 million for RDT&E or $1 billion for procurement, or if it has been so designated by the Secretary of Defense.

[7] In NAVSEA, SEAWOLF (an attack submarine) is headed by a PEO and the AEGIS program is managed by a DRPM. The PEOs and DRPM in NAVAIR are displayed in Figure 4.2.

In the case of NAVSEA ship acquisitions, PMs are also known as Ship Acquisition Program Managers (SHAPMs). For smaller projects, the term acquisition manager is used instead of program manager. The individual with immediate legal responsibility for acquisition contracts is known as the Contracting Officer.



NOTE: Certain Program Executive Officers and Direct-Reporting Program Managers report neither to NAVAIR nor NAVSEA, but rather to ASN (RD&A). Dashed lines indicate reporting relationship.

Figure 4.2—Naval Air Organizations and Reporting Relationships for RDA

Table 4.1

Scope of RDA Programs Managed by DON Systems Commands

Systems Command	Scope of RDA Programs
Naval Air Systems Command (NAVAIR):	Navy and Marine Corps aircraft systems and components (including fuel and lubricants); air-launched weapon systems and components (excluding torpedoes and mines); other airborne and air-launched systems and components, such as electronics, underwater sound, catapults, aircraft and missile range and evaluation instrumentation, mine countermeasures, targets, pyrotechnics, photographic and meteorological equipment; and training and support systems for the foregoing.
Naval Sea Systems Command (NAVSEA):	Ships, submersibles, other sea platforms, and craft; shipboard combat systems, including sensors, tactical data systems, surveillance and fire control radars, sonars, computers, guns, launchers, ammunition, guided missiles, mines, and torpedoes; shipborne components, including nuclear and non-nuclear propulsion, electrical generating equipment, auxiliary power generating and distribution systems, interior communications, navigation equipment, deck machinery, weapon and cargo handling, stowage, and damage-control systems; diving and salvaging equipment; explosive ordnance disposal and explosive safety; and ship systems integration.
Naval Facilities Engineering Command (NAVFAC):	Shore facilities and fixed surface and subsurface ocean structures; materials and equipment for advanced base functional components; tools, equipment, and techniques for construction and maintenance of fixed surface and subsurface ocean structures; materials and appliances for defense ashore against chemical, biological, and radiological warfare.
Naval Supply Systems Command (NAVSUP):	Logistics research and development; weapon system program support; materials-handling equipment not otherwise assigned; special clothing not otherwise assigned; automation of Navy technical data; and naval materiel for which responsibility is not otherwise assigned.
Marine Corps Systems Command MARCORSYSCOM):	Equipment intended for use by landing forces in amphibious operations and other land warfare, including ground support and communications equipment in support of aircraft, and Marine Corps applications and support of materiel procured in cooperation with other services.

SOURCE: U.S. Department of the Navy, *RDT&E/Acquisition Management Guide* (1989).

As an example, Figure 4.1 portrays the RDA reporting chain within NAVAIR, showing the relationship between the NAE and the PEOs, DRPMs, and SYSCOMs.[8] Although most program managers are located in the systems commands, they are also found in other claimant organizations that have R&D or acquisition programs. Program managers are directly responsible for developing program cost estimates for resource sponsors to use in developing the Navy POM, and for repricing estimates used in the Navy Budget.

RDT&E MANAGEMENT

The Research, Development, Testing, and Evaluation (RDT&E) appropriation is intended to support basic research, applied research, initial development, and even production of prototype systems for testing and demonstration purposes—but not regular production of operational systems. On the other hand, some RDT&E projects specifically aim to develop systems for subsequent acquisition. Therefore, the OSD programming structure distinguishes between the use of RDT&E for initial investigations and its use in carrying a specific acquisition program toward production.

RDT&E for basic research and initial development investigations is recorded in the FYDP under Major Force Program 6 (Research and Development). MFP 6 program elements are further grouped into five categories, as follows:[9]

- 6.1 Research: Scientific study and experimentation to increase knowledge related to long-term national security.
- 6.2 Exploratory Development: Applied research and initial development efforts to solve specific military problems, short of major development.
- 6.3 Advanced Development: Projects that have moved to the development of hardware for testing, but for which the objective is

[8]U.S. Department of the Navy, Naval Air Systems Command (1992).

[9]In the program-element numbering system, the MFP number appears in the second position and the RDT&E category appears in the fourth position. Thus, for example, the first four digits for an exploratory development technology project would be 0602. The program for aircraft technology development, for example, is given the sequence 0602241N.

proof of design concept rather than development of operational hardware.[10]

- 6.4 Engineering Development: Programs in full-scale development that have not been approved for production or have not been budgeted for production in the current DoD budget submission.
- 6.5 Management and Support: Support of installations or operations required for general research and development, such as test ranges, military construction, or maintenance support for laboratories.

In addition, another program category for RDT&E is 6.6 Operational Systems Development, used for projects currently in full-scale development that have already been approved and budgeted for production. However, line items in this category do not appear in MFP 6. Instead, these investments appear as RDT&E-funded costs of weapon systems listed under other Major Force Programs.

RDT&E projects may originate from a variety of sources, and they are programmed and budgeted like other DON programs. In the case of Exploratory Development, which provides a critical transition from generalized research to useful application, projects are assessed by the Office of Naval Technology (ONT), which reports to the Chief of Naval Research. These projects are grouped into *blocks*, groups of projects with closely related applications or technical objectives, and are assigned to a lead laboratory or systems command program manager. The claimant submits a block program plan each year. If approved, the plans become the basis for issuing funding documents and the reference point for subsequent progress reviews by the ONT.

The *Research and Development Descriptive Summary* (RDDS), a document developed by program managers, provides concise justification for each RDT&E program element, and covers purpose, structure, and activities to be funded. An RDT&E Project Listing is a computerized display of an entire DON RDT&E program showing

[10]Although the distinction is not often made, because of the significant differences in cost, it may also be useful to the cost analyst to distinguish between 6.3A (which consists of prototyping and breadboard demonstration) and 6.3B (which consists of advanced development prototyping).

funding by program element and budget project. It is used to support budget submissions to NAVCOMPT, OSD, OMB, and Congress, and for POM submissions and apportionment requests.[11] Having completed our discussion of DON RDT&E, we turn, in the next section, to acquisition management.

ACQUISITION MANAGEMENT

When an RDA activity becomes an acquisition program, it is subjected to *acquisition management*, a sequential process with multiple decision milestones. Although there are special features for ship acquisitions (discussed below), the basic process is described the same way in the DON and OSD, as illustrated in Figure 4.3. At each milestone, costs and capabilities are reassessed on the basis of accumulated information, and a decision whether to proceed to the next milestone is made. The remainder of this section describes each milestone and related documentation.

Milestone 0

Operationally, an RDA activity becomes an acquisition program, and therefore is subjected to acquisition management and review procedures, at what is known as the Milestone 0 decision. The activity may be preceded by considerable research and development, perhaps including an Advanced Technology Demonstration (ATD) funded under RDT&E program 6.3. In any case, the Milestone 0 decision is preceded by a *requirements phase*, which gathers sufficient information to identify specific operational objectives for the system and reasonable estimates of its remaining RDT&E and eventual procurement costs.

A program passes Milestone 0 upon the approval of the appropriate statement of need: a Navy *Operational Requirements Document*

[11]Another source of information on RDT&E projects not leading to procurement is the *Non-Acquisition Program Definition Document* (NAPDD). It defines and gives direction to Advanced and Engineering Development programs that explore technologies or integrate systems not directly related to procurement. However, small Non-Acquisition Category (non-ACAT) programs, i.e., less than $200,000 per year or less than $1 million in total cost, do not require NAPDDs.

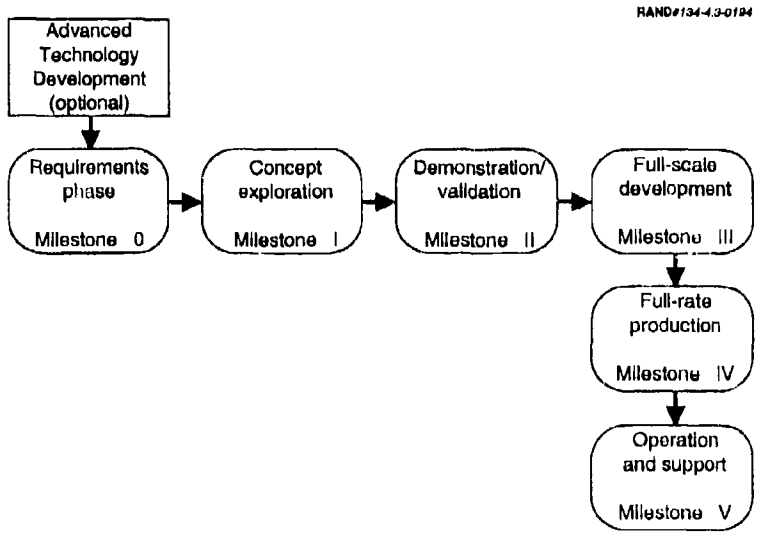


Figure 4.3—The Acquisition Management Process

(ORD), a Marine Corps *Required Operational Capability* (ROC), or—for major programs—a *Mission Need Statement* (MNS). In all cases, the statement describes the mission role of the system,[12] operational concepts and technologies, funding aspects and implications, and the acquisition strategy.

- *Operational Requirements Documents* are developed by systems commands and resource sponsors and are approved through the DON programming process. They base all performance thresh-

[12]There are a number of Navy classification structures for specifying mission need. Two important examples are the Navy Combat Readiness Criteria and the Marine Corps Science and Technology Objectives (STOs). The former use the same criteria as for Navy unit status reporting; the latter are detailed in the U.S. Department of the Navy's *RDT&E/Acquisition Management Guide* (1989).

olds on an analysis of mission demands and comparable fleet and commercial system experience.[13]

- *Required Operational Capabilities* documents are similar to ORDs but are drafted by the Marine Corps Combat Development Command (MCCDC) and pertain to programs specific to the Marine Corps (as distinguished from systems or equipment developed by other services).
- *A Mission Needs Statement* is a version of the ORD or ROC prepared in OSD format and submitted as part of the DON POM; Secretary of Defense approval of the MNS is documented in an *Acquisition Decision Memorandum* (ADM).

The Remaining Phases

The remaining five milestones and the phases that precede them are as follows:

- Phase I, *concept exploration and definition,* examines the technical, military, and economic bases for an acquisition program, and produces options for alternative systems and their associated program characteristics (costs, schedules, and operational parameters). This phase also initiates integrated logistics support analysis (ILSA)[14] and produces documentation for Milestone I review, when the decision whether to proceed with Phase II is made.
- Phase II, *demonstration and/or validation,* focuses on testing and selecting among alternative contractor designs, and involves developing optional designs to support a Milestone II decision authorizing the beginning of full-scale development (FSD). A major consideration for all programs during this phase is whether adequate RDT&E funding has been provided to cover

[13]The Cost and Operational Effectiveness Analysis is supposed to precede the ORD but, in fact, is often performed in parallel.

[14]ILSA aims to integrate readiness and support considerations into the system's design, schedule, cost, and acquisition plan. Logistics support elements under consideration are maintenance; manpower and personnel; equipment; supply; technical data; training; computer resources; facilities; packaging, handling, storage, and transportation information; and design interface.

technical work, comprehensive design and engineering, and integrated logistics support (ILS) planning.

- Phase III, *full-scale development*, is the phase during which the weapon system (including all the items necessary for its support, e.g., training equipment, maintenance equipment, and operation, and maintenance manuals) is designed, fabricated, and tested. It leads to a Milestone III decision on whether to proceed with production, which is usually delegated to the Secretary of the Navy, even for major programs. For large programs, this phase may involve successive milestone decisions, i.e., IIIA for limited production and/or IIIB for full-rate production.
- Phase IV, *full-rate production*, is the phase during which the weapon system, including training equipment, spares, etc., is produced for operational use; some operational test and evaluation is conducted; and the weapon system is provided to and used by operational units.[15]
- Phase V includes operation and support of the deployed systems. After five to ten years, the system may be reviewed for replacement or upgrade.

Ship acquisition phases use special terminology (listed in Table 4.2) because there is no prototyping per se; the *lead ship*—the first ship of

Table 4.2

Shipbuilding Program Phases and Milestones

Milestone 0	Program initiation decision
Milestone I	Preliminary design
Milestone II	Decision for lead-ship design (during contract design)
Milestone III	Decision for follow ships
Milestone IV	Lead-ship initial in-service review
Milestone V	In-service mid-life modernization, if needed

SOURCE: U.S. Department of the Navy, *RDT&E/Acquisition Management Guide* (1989).

[15]If procurement funds are used to pay for the operational testing and evaluation (OT&E), then that expenditure is included in flyaway or sailaway cost.

a particular class—serves a purpose similar to prototyping. Normally, only one ship would be authorized for construction in the first year, followed by no production in the second year, then a low rate of production. There is also special congressional language in appropriations for ship production, allowing for as many as eight or nine years from authorization to launch for a carrier.

Acquisition Review and Documentation

For all types of acquisition programs, the level of documentation, review, and approval necessary to initiate and continue a program depends primarily on anticipated cost. The size of an acquisition program is described by its acquisition category (ACAT): major programs are designated ACAT I in the Navy, and are subcategorized as ACAT ID if Secretary of Defense approval is required, or ACAT IC if approval has been delegated to the SECNAV.[16]

Marine Corps acquisition programs rarely fall in ACAT I. Programs of that magnitude are normally undertaken cooperatively with another service that takes the lead in acquisition management; for example, the Marine Corps has purchased M1A1 tanks in cooperation with the Army.[17] Consequently, the Marine Corps rarely takes the lead in presenting programs for DAB milestone review.

Other Navy acquisition program categories, ACATs II through IV, are subject to DON, but not DAB, milestone review. ACAT II programs have RDT&E costs ranging between $100 and $200 million and/or

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[16]Management, analysis, and review of ACAT I programs are governed by DoD Instructions in the 5000 series. Corresponding SECNAV and OPNAV instructions are similarly numbered. There are also non-acquisition category (non-ACAT) programs, which involve a level of effort that does not directly result in the acquisition of a system or equipment for operational deployment, and usually involve science and technology, concept exploration and definition, or advanced development of potential ACAT programs, some systems integration efforts, or management/support of installations or operations required for general-purpose research; such programs are reviewed annually by CNO/CMC (or their designees) and ASN(RDA). See U.S. Department of the Navy, SECNAVINST 5000.2A (1992b), Enclosure 5, p. 4.

[17]The Marine Corps participates in a *cooperative acquisition* by transferring funds to another service to cover a share of the development program conducted by that service. In other cases, the Marine Corps may simply indicate official interest in a development program totally funded by another service, or may participate in a Joint Service Program.

procurement costs from $500 million to $1 billion (and do not otherwise meet ACAT I criteria), or are so designated by the Secretary of the Navy. ACAT III programs are designated by the CNO or CMC, and ACAT IV is the residual category for all other programs; programs in ACATs III and IV are normally exempt from Milestone I review.

All acquisition initiatives are reviewed by the same DON committee structures used in POM review, including the DON Program Strategy Board (DPSB).[18] However, the DON has established additional review mechanisms—two review bodies specifically for acquisition decisionmaking and oversight boards:[19]

- Navy and Marine Corps Program Decision Meetings (NPDMs/MCPDMs). The only DON-level decision briefing is the Program Decision Meeting (PDM). A PDM is the DON forum for acquisition program milestone decisions in ACATs I through III; it is attended by the PEO (or DRPM/SYSCOM commander) and Program Manager (as briefer). The NAE is the chairman for major acquisition programs. Other participants represent the ASN(RDA), N8/OP-08, the CNO or Marine Corps Commandant, and the Assistant Secretary of the Navy for Financial Management.
- Acquisition Review Board (ARB). Normally convened by a systems command, the ARB provides the lowest level of DON acquisition review. It is normally the sole decision forum for ACAT IV projects.
- Navy and Marine Corps Oversight Boards. Oversight Boards provide advice and counsel to COEA[20] Study Directors as alter-

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[18]Formerly involved in the review process, but disestablished in the recent reorganization, were the Program Development Review Committee; the Program Review Committee; and the Acquisition Review Council, which was the OPNAV forum for reviewing acquisition programs with respect to operational requirements, testing, and funding. Also disestablished was the CNO Executive Board, which had several panels that had RDA responsibilities.

[19]Other committees and boards provide general planning and advisory assistance for RDT&E as well as acquisitions. Examples are the Naval Research Advisory Committee and the Board for Naval Studies from the National Academy of Sciences.

[20]Described later in this section.

native concepts, scenarios, and assumptions are being formulated, and provide recommendations to ASN(RD&A) and N8 (DCNO, Resources, Warfare Requirements, and Assessment) or DCS(RP) (Deputy Chief of Staff [Requirements and Programs]) for the Marine Corps. The board also reviews in-progress analysis to ensure that the analysis addresses the key issues, and that related assumptions and limitations are clearly stated. Members of Navy Oversight Boards typically include ASN(RD&A) staff; DCNO (N8) staff, including representatives from Assessment and the program sponsor; Director of Test and Evaluation and Technology Requirements (N091); Director of Naval Intelligence (N2); Supporting Systems Commands; Associated PEO/DRPM; Program Manager; and DCS(RP) for Navy-sponsored Marine Corps programs. The Naval Center for Cost Analysis and the ASN(RD&A) Senior Advisor for Analyses are also invited to contribute to board deliberations as independent advisors. Marine Corps Oversight Boards are similarly composed, with DCS(RP), MCCDC, MARCORSYSCOM, and MCOTEA substituting for their Navy counterparts.

The following three tables list the key documents associated with Navy acquisition activities: Table 4.3 conveys the range of program

Table 4.3

Navy Acquisition Program Plans

Acquisition Plan
Systems Engineering Management Plan (SEMP)
Human Systems Integration Plan (HSIP)
Configuration Management Plan (CMP)
Manufacturing Plan
Software Development Plan (SDP)
Computer Resources Life-Cycle Management Plan (CRLCMP)
Integrated Logistics Support Plan
Training Development Plan (Navy Training Plan)
Test and Evaluation Master Plan
Program Protection Plan
Technology Assessment and Control Plan (TA&CP)

SOURCE: U.S. Department of the Navy, SECNAVINST 5000.2A (1992b), Enclosure 25, pp. 1–2.

plans that are typically required for acquisition programs; Table 4.4 describes the various documents required for ACAT I, II, and III programs; and Table 4.5 describes the reports that are required for periodic reviews of ACAT I, II, III, and IV programs.

Whereas many of the documents noted in Table 4.5 may prove useful to the cost analyst because they contain data that reflect or support cost analyses, some are especially likely to contain cost-related data:

- The *Acquisition Program Baseline Agreement* (APBA) is an agreement signed by the PM, PEO/SYSCOM/DRPM, CNO/CMC (or

Table 4.4

ACAT I, II, and III Milestone Documentation

Requirements Documents
Mission Needs Statement
Operational Requirements Document
System Threat Assessment Report
Intelligence Report
Integrated Program Summary
Acquisition Strategy Report
Integrated Program Assessment
Program Life-Cycle Cost Estimate
Acquisition Program Baseline Agreement
Manpower Estimate Report
Test and Evaluation Master Plan
Low-Rate Initial Production Report (for Naval Vessels and Satellites)
Live Fire T&E Waiver
Competitive Prototype Strategy Waiver
Developmental T&E Report
Independent Documents
Independent Cost Estimate (Service)
Independent Cost Estimate Report (CAIG)
Cost & Operational Effectiveness Analysis (COEA)
Early Operational Assessment Report
Operational T&E Report
Live Fire T&E Report
Beyond Low-Rate Initial Production Report
Other Documents
Acquisition Decision Memorandum

SOURCE: U.S. Department of the Navy, SECNAVINST 5000.2A (1992b), Enclosure 11, pp. 8–9.

Table 4.5

ACAT I, II, III, and IV Periodic Reports Review Process Documentation

Acquisition Reports
Defense Acquisition Executive Summary
Selected Acquisition Reports
Defense Enterprise Program (Milestone Authorization) Baseline Description and Request to Obligate Funds
Exception Reports
Exception DAES
Exception SAR
Program Deviation Report
Report of Results of Program Deviation Review
DEP(MA) Breach Congressional Notification Letter
Exception Unit Cost Report Congressional Notification Letter
Exception Unit Cost Report Congressional Certification Letter
Procurement Reports
Acquisition Plan
Justification & Approval
Business Clearance
Contract Award Announcement
Multi-Year Procurement Contract Certification
Fixed-Price-Type Contracting Certification
Value Engineering Report
Contract Cost Management Reports
Contract Cost Data Reporting Plan

SOURCE: U.S. Department of the Navy, SECNAVINST 5000.2A (1992b), Enclosure 11, pp. 12–13.

designee), the NAE (for ACAT ID, IC, II, and III programs), and the USD(A) (for ACAT ID programs) approving the overall program in accordance with key performance, schedule, and cost parameters, and management of the program within specified programmatic, schedule, and financial constraints specified in the Acquisition Plan. Sometimes called the "Acquisition Baseline," the APBA contains a great deal of cost information on the program, providing a five- to six-year picture of funding broken out by production, RDT&E, and other categories; it specifies unit production and other important characteristics of the program.

- The *Acquisition Plan* (AP) is the principal document for in-depth oversight of very large programs by the Navy Secretariat; it is re-

quired whenever estimated development costs are $2 million or more, annual production or services costs are $5 million or more, or total costs are $15 million or more. The AP begins as a broad outline and is expanded and refined as the program progresses. APs include information on funding, methods of contracting, source selection, contract type, competition, cost, and delivery schedule.

- As its name implies, the *Program Life-Cycle Cost Estimate* provides life-cycle cost estimates for the acquisition program.
- The *Test and Evaluation Master Plan* is required for all programs at all milestone decision points, and identifies funding for test and evaluation. The TEMP is the controlling document for ACAT III and IV programs.
- The *Integrated Program Summary* provides an overview of the program.
- *Selected Acquisition Reports* (SARs) are designed for use by OSD, Congress, and the General Accounting Office (GAO). SARs are prepared by PMs, subject to SECNAV approval. They include past information on costs, schedule, and technical achievements; current estimates of the system's operational and/or technical characteristics, and probable cost; and likely date of operational availability. SARs are submitted annually with the President's Budget and quarterly if (1) total program cost increases or decreases by 5 percent; (2) a schedule slips by six months; or (3) a major milestone decision occurs.
- Many of the *Exception Reports* in Table 4.5 may document cost overruns in an ongoing acquisition program.
- *Program Change Funding Proposals* (PCFPs) document proposed changes in an ongoing acquisition program. The PCFP is often used to specify a modernization or block improvement program, or to achieve higher reliability or maintainability in a system. It may also be used as a way of reprogramming funds across programs, or to provide early warning of impending cost overruns. A PCFP must be approved by the NAE prior to obligating or expending funds for the proposed program change.

COST ESTIMATION AND ANALYSIS

RDA decisionmaking has long been an important motivation for defense costing studies. Cost comparisons help inform choices among designs of alternative weapon systems and components; cost projections support decisions about the affordability of future systems, about the budget implications of production and delivery schedules, and about effects on out-year operating and support requirements. Cost estimates also establish a benchmark for measuring program management and performance, establish criteria for remedial action, and highlight changes in plans as a program moves from planning to completion.

The wide variety of costing applications has yielded specialized formats, methods, and nomenclature for describing RDA cost estimates. Our concern, however, is with the particular costing terminology and approaches used by the Navy.

Cost Categories

Early in the acquisition process, a Cost and Operational Effectiveness Analysis is performed, a process that begins with a COEA proposal and provides the parent document for the ORD, TEMP, and *Acquisition Plan Baseline Agreement.* The COEA process provides a forum for involving OPNAV and/or HQMC and the acquisition community in alternative cost-performance trade-off discussions, and formulation and documentation of the analytic underpinning for program decisions; it is also useful in gaining early insight into life-cycle costs. COEAs are performed at most milestones:

- Milestone I COEAs help the Milestone Decision Authority (MDA) choose a preferred system concept and decide whether cost and performance of the concept warrant initiating an acquisition program.
- Milestone II COEAs refine the analysis of the cost-performance drivers for the preferred concept selected at Milestone I and, where feasible, develop analysis that will support the selection of program thresholds and objectives for use in the ORD, TEMP, and APBA.

- Since cost and operational effectiveness issues will typically have been resolved before a Milestone III decision, a COEA is normally not required to support this milestone.
- At Milestone IV, a decision on whether to initiate a major upgrade of a system is required. Since the proposal typically placed before the MDA will be to initiate Engineering and Manufacturing Development for the upgrade, issues considered at both Milestones I and II normally need to be weighed.

COEAs for ACAT I, II, and III programs[21] are reviewed by Oversight Boards composed of senior and experienced leaders from both the acquisition and OPNAV/HQMC communities, discussed earlier. COEA proposals, study plans, and final reports are approved by ASN(RD&A) and DCNO(N8)/DCS(RP) for ACAT I, II, and III programs, and program sponsor and PEO/SYSCOM/DRPM for ACAT IV programs.

The most comprehensive costing measure for a weapon or other system is its life-cycle cost (LCC). Based on guidance developed by the OSD Cost Analysis Improvement Group, the major categories of LCC cost are (1) research and development (primarily RDT&E-funded costs, but possibly including military construction of R&D facilities); (2) procurement; (3) Operations and Support (primarily costs funded by Operations and Maintenance and Military Personnel accounts); and (4) disposal. In the Navy, the first three milestones include Program Life-Cycle Cost Estimates.

DoD Instruction 5000.2 requires a CAIG review of LCC estimates for major acquisitions subject to the DAB process. Such estimates include estimates prepared by the program office for Milestones I through V, and independent service estimates (i.e., prepared within a service by an office other than the system proponent) for Milestones 0 through V. The Navy Center for Cost Analysis provides the independent estimates, which are known in the Navy as assessments.

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[21]Milestone Decision Authorities decide whether an ACAT IV program warrants the establishment of an Oversight Board.

Thus, both the program office (usually in a systems command) and NCA perform full LCC costing for acquisitions in ACAT ID.[22]

For other acquisitions, however, the DON normally does not produce full-CAIG LCC estimates. Program offices will consider logistics, manning, and other operating and support issues[23] in the course of acquisition planning, but the emphasis in cost estimation and documentation is on the first two LCC components: research and development, and production. It is these components that enter affordability calculations in program planning exercises, and it is these components that establish the critical benchmarks for evaluating program management and performance.

The benchmark for program evaluation is known as a *baseline cost estimate,* which itemizes elements of production cost. Whereas full estimates for CAIG review need to be updated only for each major acquisition milestone, baseline estimates are updated annually by the program manager. Each reestimate reflects additional information and perhaps changes in system objectives or schedules as the program evolves. The various versions of a baseline estimate are known as the planning estimate (PE), development estimate (DE), production estimate (PdE), and current estimate (CE). Baseline cost estimates use the standard nomenclature in Table 4.6 to itemize elements of production costs. As the table indicates, the measures for procurement cost and program acquisition cost are reported in SARs, along with RDT&E cost estimates.[24]

The table also refers to a Work Breakdown Structure (WBS), which is a standardized trilevel coding system covering all the types of work required to develop, procure, operate, and support a system. For example, the first level might be "aircraft system," the second might be "air vehicle" or "training," and the third might be "armament" for the air vehicle or "facilities" for training. The general WBS is docu-

[22]The Marine Corps also performs full LCC estimates when it has an ACAT ID program.

[23]Disposal issues also are considered in circumstances in which a design option or an alternative to acquisition could reasonably be expected to cause noticeable differences in disposal costs.

[24]SARs may also report O&S costs when estimates are provided by the program office. Navy SARs generally omit O&S costs other than contractor support costs.

mented in MIL-STD-881, but NAVSEA has developed a special WBS for ships. It contains subheadings for Level 3 to capture, for example, subcategories of hull structures.[25]

Table 4.6

Standard Navy Cost Definitions

Production Cost Element
Flyaway (or Sailaway) Cost
Basic unit (airframe, hull, chassis, frame, etc.)
Propulsion equipment
Electronics and/or avionics
Armament
Installed government-furnished equipment (GFE)
Other Level 3 Work Breakdown Structure hardware and/or software subsystem elements
System project management and system test (as appropriate)
Nonrecurring and recurring production costs
Weapon System Cost
Flyaway cost (see above)
Peculiar ground support equipment
Peculiar training equipment
Data (publications, technical)
Contractor plant and field services
Installation and checkout
Procurement Cost (as shown in the SAR)
Weapon system cost (see above)
Initial spares
Outfitting post-delivery, cost growth, escalation, and ship contract design (Navy Shipbuilding only)
Program Acquisition Cost (as shown in the SAR)
Procurement cost (see above)
RDT&E
MILCON

SOURCE: U.S. Department of the Navy, *RDT&E/Acquisition Management Guide* (1989).

[25]According to the U.S. Department of the Navy, *RDT&E/Acquisition Management Guide* (1989), the NAVSEA WBS is documented in NAVSHIPS 0900-039-9010.

Because baseline estimates vary in reliability according to when they are generated and how much detail goes into them, the Navy has also developed a system for labeling the quality of estimates. Table 4.7 lists the labels and their interpretations, in descending order of reliability.

Costing Approaches

As in the other services, the Navy and Marine Corps use three principal methods to estimate costs for new systems:

- *Engineering,* or "bottom-up," *estimates* are based on detailed system specifications and drawings, industrial engineering standards, etc. Since they depend on system-specific information, these estimates are sensitive to design and manufacturing changes. But because they require detailed information, engi-

Table 4.7

Navy Cost Estimate Confidence-Level Classifications

Class	Description
Class A	Detailed cost estimate (post-budget-contract estimates). Estimate based on contract plans and evaluation of firm quotations for major materiel items.
Class B	Bid evaluation cost estimate (post-budget-contract estimates). Estimate based on contract plans and evaluation of contractor RFP-based bids.
Class C	Budget quality estimate. Estimate based on an engineering analysis of detailed characteristics of item under consideration.
Class D	Feasibility estimate. Estimate based on technical feasibility studies and/or extrapolated from higher-quality estimates of similar items.
Class E	Computer estimate. Estimate developed using a computer model and based on cost estimating relationships (CERs) and general total parameters.
Class F	Ballpark estimate. Quick cost estimates prepared in absence of adequate design and cost information and based on general parameters.
Class X	Directed or modified cost estimate. Estimate not developed by system commands through normal cost estimating processes.

SOURCE: U.S. Department of the Navy, *RDT&E/Acquisition Management Guide* (1989).

neering estimates may not be feasible for systems that are not fully defined.

- *Parametric estimates* are based on statistical relationships observed in data on the actual costs for existing systems; that is, actual development, production, or occasionally even O&S costs are related to such variables as system size, complexity, and development time.
- Cost *estimates by analogy,* like parametric estimates, are founded on the premise that a new system's costs can be estimated from past experience on other systems. However, analogy-based estimates depend on selecting a few (perhaps only one) existing systems that are very similar to the new one, and they frequently make ad hoc adjustments to account for system differences.

Parametric and analogy-based estimates often refer to *Contractor Cost Data Reports* as a source of RDT&E and production cost information for existing systems. These reports are particularly useful because they are mandatory for all major programs and acquisitions and use a standardized format and terminology.

Program managers are particularly concerned with estimating the budget costs for the items for which they are responsible, i.e., that will have to be covered by R&D and production contracts. Such items include initial spares, which are parts and components purchased in conjunction with the system; they would exclude, for example, replenishment spares that will be purchased to replace repairable spares that are condemned as beyond repair after the system is in operation, and supporting manpower (especially civilians). As we indicated earlier, operating and support issues are generally addressed as part of the logistics evaluation of a system rather than in costing, unless the system is part of a major acquisition and subject to CAIG costing guidance. However, the large scale of ship and many aircraft acquisitions means that O&S costing is a recurring concern in NAVSEA and NAVAIR.

There is no standard Navy guidance for program manager costing methodology across systems commands. All commands use the costing categories established by the CAIG for major acquisitions and model each category, but analysts may use different costing methods within a category, such as manpower. Each of the systems com-

mands has a central costing shop that reviews PMs' estimates, and the larger shops provide costing assistance, including modeling support. Differences among costing organizations include the following:

NAVSEA. Before the last decade, NAVSEA simply assembled ship construction estimates obtained from PMs. In 1984, however, NAVSEA started assembling data on unique upfront costs, for example, for new facilities and the AEGIS system. In 1986, the office also started doing O&S cost estimates that had been done by contractors for PMs. The office has been building O&S costing models for ships in ACATs I and II. However, there are no standard NAVSEA models for weapon system O&S costs.

NAVAIR. NAVAIR also expanded its costing capabilities during the mid-1980s but was realigned in 1989. Costing work has had limited resources since then. However, NAVAIR has recently contracted to update an O&S costing model that uses parametric methods (CER).

SPAWAR. SPAWAR provides very little centralized costing support to its PMs. That capability existed until the SPAWAR cost shop was reoriented to provide contract management support several years ago. PMs rely on contractors and other sources for O&S costing for the few ACAT I or II programs managed through SPAWAR.

NCA. To perform assessments (i.e., independent estimates for CAIG review), the Naval Center for Cost Analysis requires certain basic information about the new system to be costed. The objective is to prepare a separate cost estimate for the same system, purchased in the same quantities, and operated under the same conditions as were costed by the Program Manager. NCA usually obtains the physical characteristics of the system from OPNAV's *Top-Level Requirements* documents, production schedules from the systems command, and steaming or flying hours from OPNAV. NCA typically uses parametric estimation methods, but has been moving toward greater use of engineering estimates.

Assessments are not updated between milestones unless there is an out-of-cycle CAIG review (called a POM CAIG review). Before each milestone, there is a *CAIG rehearsal,* in which NCA reviews the PM's baseline estimates. Then NCA publishes a *Memorandum for Princi-*

pals that lays out the Navy estimate and identifies discrepancies, if any, from the PM's estimates.[26]

HIGHLIGHTS FOR THE COST ANALYST

Our general observation about the RDA costing in the DON is that it shows unique characteristics in all three of its weapon system dimensions—air, ground, and sea. Aircraft issues differ from those in the Air Force because Navy and Marine Corps air wings use a combination of aircraft types and operate them in close coordination with ships and other force elements. Although DON and Air Force acquisition costing is quite similar, aircraft O&S costing differs significantly.[27] Ground equipment issues differ from those in the Army because the Marine Corps rarely tackles truly large acquisitions independently and is small enough to permit extensive analysis and evaluation through direct contacts among the key players in the RDA decision process. And ship acquisition issues are unique because key types of ships are purchased in small numbers, with each unit representing a major and costly force element in its own right.

The RDA process in the Navy and Marine Corps is highly integrated with, and intrinsic to, the PPBS process. In effect, systems commands (including MARCORSYSCOM) perform weapon-system capability and cost analyses much as resource needs are analyzed for other purposes, and transmit this information for incorporation in the POM. This similarity is consistent with the tendency of program managers to focus primarily on R&D and procurement costing, leaving O&S issues to manpower and logistics support analysts in the Navy's cross-cutting assessment process. Even for major acquisitions, for which full O&S costing is required, the NCA independent estimates are viewed in the Navy as "assessments."

In principle, O&S costing exercises can differ in methodology according to whether the weapon system or force element is the unit of analysis. For ships, weapon system and force structure decisions are closely aligned; that is, costing a ship (with its manning, operating

[26]Assessments are also performed for NPDM and MCPDM exercises.

[27]Both services' cost analysis communities use CCDRs and somewhat similar parametric models for acquisition costs.

costs, etc.) is the same as costing a combat unit or combat support unit. However, the alignment between force elements and weapons systems is not as close for aircraft (where wings typically include many TMSs) or for Marine Corps ground equipment. Nonetheless, separate O&S costing methods for forces and systems have not been developed in the DON for two reasons: The Marine Corps rarely has ACAT ID programs requiring O&S costing, and O&S costing for Navy aircraft is done primarily for CAIG reviews and is omitted from affordability analysis in the POM development process.

Special features of ships acquisitions also affect RDA costing for the Navy. In particular, the production of the lead ship within full-scale development is funded by procurement rather than RDT&E funds. Accordingly, R&D costs for ships tend to be a much smaller fraction of total program acquisition cost than for other types of weapon systems. Ship acquisition costing is also an unusually complicated exercise because the acquisition programs are often spread over a very large number of cost centers (shipyards, contractors, etc.).

Programming in connection with ship acquisitions can also raise or amplify issues in resource coordination. These programs are particularly likely to entail construction of new facilities in support of RDT&E projects; since RDT&E funds cannot be used for that purpose, program managers must carefully anticipate the need for Military Construction funds and account for them in their baseline estimates. Similarly, the long lead times involved in ship construction, together with the major increments in personnel required to man ships, imply that personnel requirements must be anticipated well in advance and recognized in the manpower authorization process.

Chapter Five

ISSUES FOR DON COSTING

This chapter summarizes what appear to the authors to be the most important issues related to costing in the Department of the Navy.

The United States continues to rely on its seagoing fleets and amphibious forces for military force projection around the world. It maintains a potential to respond to crises that can erupt on any continent. Nevertheless, the Navy faces significant fleet reductions and the Marine Corps is already experiencing a multiyear downward trend in procurement. The Department of the Navy has not been, and will not be, immune to major swings in force size objectives and reorientation of some of its missions.

During the next decade, in particular, the DON will undertake considerable downsizing relative to plans envisioned just a few years ago. The planned fleet will be smaller by at least 100 deployable ships. Active-duty end-strengths, which in 1990 stood at over 590,000 for the Navy and over 196,000 for the Marine Corps, were expected to be at 441,641 and 174,000, respectively, by FY 95; more cuts are possible. Iowa-class battleships have been mothballed, the planned number of aircraft carriers has been reduced from 15 to 12, and forward-deployed maritime forces have been reduced in some areas.

For certain decisions on force structure, it is difficult to untangle changing operational requirements based on a diminished threat from the effects of budgetary constraints. For example, until recently, a notional carrier battle group consisted of an aircraft carrier and a total of eight to ten escorts (four AAW cruisers/destroyers, two ASW destroyers, two frigates, and support ships); owing to a reduced

threat to the carrier, coupled with budget limitations, Navy planning now assumes one carrier and four to six escorts.

Similarly, cost considerations have been responsible, at least in part, for revisions in carrier air wing requirements. As recently as 1988, the Navy's plan called for employing 13 active and two reserve air wings in the Theodore Roosevelt configuration—20 F-14 fighter aircraft, 20 fighter/attack aircraft, and 20 A-6 or A-12 medium attack aircraft, plus 24 to 26 other aircraft. Although cuts in the planned carrier fleet have reduced the requirement for air wings, budget limits still suggest the Theodore Roosevelt configuration is unaffordable. The initial response was to move to a Transitional air wing that reduced the number of medium attack aircraft to 16. The current notional air wing consists of 50 fighter/attack aircraft.

Furthermore, the DON will implement changes in support structure and workloads. At least one dozen DON installations are currently targeted for closure over the next decade. Meanwhile, the changing force and basing structures raise difficult issues for such supporting activities as depot maintenance. There are concerns that maintenance workloads will first fall dramatically, then rise again as the weapon system configuration changes. Such concerns raise questions about how best to manage the fluctuating workloads.

Planning and allocating limited budgets in such an environment pose difficult challenges for Navy and Marine Corps resource and program managers. Part of the challenge will simply be to resolve internal disputes. Declining budgets exacerbate competition for scarce resources, and the separate warfighting communities can be expected to argue strenuously that their own programs deserve higher priorities. For example, the air warfare community has argued that additional funds should be devoted to aircraft procurement, because a reduced Soviet threat implies reduced requirements for naval strategic capability.[1] The recent reorganization, which simultaneously created the N8 organization and subordinated the warfighting communities to N8, appears to represent an effort to facilitate programmatic dispute resolution.

[1]Morrocco (1990).

Beyond conflict resolution, however, the Navy and Marine Corps will have to address complex issues in resource-requirements projection. When force structure changes significantly, the requirements for support activities can change radically, and in ways that are not easy to predict. Traditional budget shares across activities can be a good guide for resource planning when force and support structures change little or slowly; they may produce unbalanced structures and isolated shortfalls when structures change markedly.

The DON's approach to resource management has both strengths and weaknesses in such an environment. Unlike the other services, the DON has not had conventions for associating "slices" of support activities with the force-structure elements they support. Instead, the DON system has called upon its main warfighting communities to account not only for their direct force-structure requirements but for those of directly associated support functions, as well, making resource decisions within that broad mandate on a program-by-program basis. At least in principle, such aggregation of responsibility within a few large mission-area categories has facilitated recognition of linkages among related activities and provided a vehicle for highlighting and resolving potential misallocations.

While the recent reorganization of OPNAV may facilitate the resource-allocation process, the DON management approach has not in the past fully overcome the inevitable difficulty in coordinating support activities that cut across warfighting communities. Generalized support functions, such as basic training, military construction, and medical support, must serve more than one warfighting community.[2] Within the DON, as in the other services, such functions have substantial costs that are nonetheless difficult to link to higher-level combat missions. The DON's cross-cutting program development and review process—focusing on functional analyses involving participation of all relevant organizations—aims to provide generalized functions with their own proponent organizations. But limited techniques for relating generalized support costs to the military capabilities they support make it difficult for the DON to anticipate how the costs would vary with changes in force size and structure, or to

[2]It should be recognized that the training establishment has been reorganized recently to reflect this consideration by associating operational training with the fleet organization rather than TYCOMs.

justify maintaining support resourcing levels when more prominent and combat-related programs face budget cuts.[3] Thus, for the DON as well as for the other military departments, the issue of achieving resource coordination between force- and support-structure elements may linger after other, more highly visible resourcing decisions are made, posing a challenge that is likely to remain relevant through the next decade and beyond.

[3]Nevertheless, the availability of macrolevel models, such as CNA's model for projecting long-term fiscal requirements and the Integrated Program Analysis System, may facilitate the costing side of this problem.

Appendi

DEPARTMENT OF THE NAVY REFERENCE TABLE

Table A.1

Ship Designators by Major Function

Designation	Ship Purpose and/or Type
	Nuclear Retaliation
SSBN	Nublear-powered ballistic-missile submarine
SSGN	Nuclear-powered guided-missile submarine
	General-Purpose Combat
BB	Battleship
CG	Guided-missile cruiser
CGN	Nuclear-powered guided-missile cruiser
CV	Aircraft carrier
CVN	Nuclear-powered aircraft carrier
DD	Destroyer
DDG	Guided-missile destroyer
FF	Frigate
FFG	Guided-missile frigate
PG/PHM	Small patrol craft
SS	Attack submarine
SSN	Nuclear-powered attack submarine
	Amphibious Warfare
LCAC	Air-cushioned landing craft
LCC	Command-control ship
LHA	General-purpose assault ship
LHD	Multipurpose assault ship
LKA	Cargo assault ship
LPD	Transport dock
LPH	Helicopter assault ship
LSD	Dock landing ship
LST	Tank landing ship

Table A.1—continued

Designation	Ship Purpose and/or Type
	Mine Warfare
MCM	Mine countermeasures ship
MSH	Mine hunter-sweeper ship
MSO	Ocean minesweeper
	Underway Replenishment
AE/TAE	Ammunition ship
AFS/TAFS	Combat stores ship
AO/TAO	Oiler
AOE	Multipurpose stores ship
AOR	Replenishment oiler
	Materiel Support
AD	Destroyer tender
AR	Repair ship
AS	Submarine tender
	Fleet Support
ARS	Salvage ship
ASR	Submarine rescue ship
ATF/TATF	Fleet tug
ATS	Salvage and rescue ship
TAGOS	Ocean surveillance ship (with sonar)
	General Support
AGS	Sound testing barge
TACS	Crane ship
TAGM	Range instrumentation ship
TAGS	Fleet Ballistic Missile support ship
TAH	Hospital ship
TAK	Cargo ship
TAKS	Maritime pre-positioning ship
TARC	Cable ship
TAVB	Aviation logistics support ship

SOURCE: Table is reproduced from Kaufmann (1987), Appendix B.

Table A.2

Department of the Navy Major Shore Activities[a] (as of end of designated fiscal year)

Activity	Fiscal Year 1989	1990	1991	1992
Total Department of the Navy	201	200	199	189
Total Navy	181	180	180	170
Administrative				
Communication stations	3	3	3	3
Finance stations	1	1	0	0
Command headquarters	8	8	8	4
Training				
Schools	7	7	6	6
Training centers	17	17	19	19
Hospitals & medical centers	19	19	20	18
Operations				
Air stations & facilities	29	30	29	28
Amphibious bases	2	2	2	2
Support activities	4	4	3	3
Naval stations & bases	12	11	11	11
Sub bases	4	4	4	4
Industrial Support				
Avionics centers	1	1	1	1
Ordnance activities	10	10	10	10
Ship repair facilities	1	1	1	1
Shipyards	8	8	8	8
Aviation depots	6	6	6	6
Supply				
Supply centers	6	6	6	5
Inventory control points	2	2	2	2
Supply activities	1	1	1	1
Construction & Maintenance				
Engineering field divisions	5	4	4	2
Construction battalion centers	2	2	2	2
Public works centers	7	7	7	7
Research & Development				
Experiment & test stations	10	10	10	10
Laboratories	7	7	7	7
All Other Navy	9	9	10	10

Table A.2—continued

Activity	Fiscal Year			
	1989	1990	1991	1992
Total Marine Corps	20	20	19	20
Command headquarters	1	1	1	1
Barracks	1	1	1	1
Bases & camps	4	4	4	4
Recruit depots	2	2	2	2
Air stations & facilities	8	8	8	8
Schools	1	1	1	1
Supply activities	2	2	2	2
Finance centers	1	1	0	0

SOURCE: U.S. Department of the Navy, Office of the Navy Comptroller, Resource Allocation & Analysis Division, *Budget & Forces Summary*, NAVSO P-3523, 30 April 1993 (published annually).

[a] *A major shore activity* is one with 500 or more permanent personnel.

Table A.3

Department of the Navy Force Structure

	Fiscal Year						
	1980	1984	1988	1991	1992	1993	1994
	Number						
	Actual					Planned	
Total Battle Forces	479	523	565	528	466	438	413
Strategic Forces	48	41	43	40	34	24	18
FBM submarines (SSBN)	40	35	37	34	30	22	16
Support (AS, TAK)	8	6	6	6	4	2	2
Battle Forces	384	425	437	385	356	346	334
Carriers (CV, CVN)	13	13	14	12	14	13	12
Battleships (BB)	0	2	3	0	0	0	0
Cruisers (CG, CAG, CGN, CA, CC)	26	29	35	47	49	52	45
Destroyers (DD, DDR)	43	31	31	31	31	31	31
Destroyers (DDG)	37	37	37	16	9	6	12
Frigates (FF, FFG)	71	94	85	59	43	35	35
Submarines (SS, SSN, SSG, SSGN)	79	98	100	87	85	88	84
Patrol combatants	3	6	6	6	6	2	0
Amphibious warfare ships	63	59	61	62	59	55	52
Combat logistics ships	46	53	58	55	50	50	48
Mine warfare	3	3	4	10	10	14	15

Table A.3—continued

	Fiscal Year						
	1980	1984	1988	1991	1992	1993	1994
	Number						
	Actual					Planned	
Support Forces	41	45	60	66	57	50	45
Mobile logistics ships	20	21	19	17	18	17	14
Support ships	21	24	41	49	39	33	31
Mobilization Forces, Category A	6	12	25	37	19	18	16
Surface combatants (NRF)	1	10	23	34	16	16	16
Amphibious warfare ships (NRF)	3	2	2	3	3	2	0
Mobile logistics ships	2	0	0	0	0	0	0
Total Defense/Miscellaneous Forces	59	121	154	156	150	167	182
Surface combatants	0	0	0	0	0	0	2
Coastal defense	0	0	0	0	0	3	11
Auxiliaries and sealift	15	97	133	140	134	150	166
Mobilization forces, Category B	44	24	21	16	16	14	3

Table A.3—continued

	Fiscal Year						
	1980	1984	1988	1991	1992	1993	1994
	Number						
	Actual					Planned	
Total Primary Aircraft Authorized 1/	4,436	4,4[illegible]	5,266	5,005	4,879	4,725	4,411
Fighter	600	521	524	488	473	407	356
Fighter/attack	2	93	448	664	665	671	755
Attack	854	775	786	601	694	621	517
Antisubmarine	135	109	157	105	101	97	96
Patrol	351	377	387	308	302	303	238
Tanker	90	102	111	112	65	67	69
Transport	164	111	98	99	104	112	113
Electronic warfare							
Warning, command & control	167	199	233	236	129	130	125
Reconnaissance							
Observation	74	70	75	36	43	36	9
Training	883	868	935	866	797	777	711
Utility	53	76	112	105	107	108	108
Other fixed wing	20	14	13	8	—	—	—
Rotary wing	1,043	1,120	1,387	1,377	1,398	1,396	1,314

Table A.3—continued

	Fiscal Year						
	1980	1984	1988	1991	1992	1993	1994
	Number						
	Actual					Planned	
Selected Navy Aircraft Squadrons							
Fighter/attack (VF/VA/VFA)	60	57	67	75	75	70	70
Reconnaissance (VQ)	4	2	4	4	2	2	2
Helicopter (HC)	5	8	9	9	9	9	7
Patrol (VP)	24	26	34	20	20	16	18
ASW (VS/HS)	22	33	25	44	45	41	38
Other	42	41	31	23	21	21	20
Marine Corps Aircraft Squadrons							
Attack/fighter (VMFA/VFA)	15	14	25	75	23	21	22
Helicopters (HMLA/HMM/HMH/HMX)	24	25	31	30	31	31	31
Other	13	16	13	7	9	9	7
Marine Corps Divisions, Active	3	3	3	3	3	3	3

SOURCE: U.S. Department of the Navy, Office of the Navy Comptroller, Resource Allocation & Analysis Division, *Budget & Forces Summary*, NAVSO P-3523, 30 April 1993 (published annually).

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ADDENDA

CHAPTER TWO

Figure 2.1, page 7: As a consequence of an organizational change, system commands now report to ASN (RD&A). The figure reflects the administrative chain of command; Operating Forces also report to CINCs in the operational chain of command. See AFSC Publication 1 [U.S. Armed Forces, *The Joint Staff Officers Guide*, Washington, D.C.: U.S. GPO]. Solid lines between boxes at the same level do not imply that organizations work together.

CHAPTER FOUR

Page 101: This chapter reflects the major changes implied by the final draft of SECNAV Instruction 5000.2A [U.S. Department of the Navy, Secretary of the Navy Instruction]; the text may reflect neither all changes in the final SECNAV Instruction nor subsequent changes to the DON or DoD-wide RDA processes.

Page 103, Figure 4.1: More recent changes include the following: The Systems Commands (SYSCOMS) now report to ASN (RDA), and the Under Secretary of Defense (Acquisition) is now called Under Secretary of Defense (Acquisition and Technology). Other organizational changes may also have taken place.

Page 106, the discussion of the Program Manager (PM) is amended as follows: PMs for major programs currently report to the PEOs; PMs for smaller programs report to the SYSCOMS.

Pages 111–115: The RDA phases and milestones of the acquisition process described in the "Acquisition Management" section were renamed in the current version of DoD Instruction (DODI) 500.2. Specifically:

- On page 111, the description of Milestone 0 is amended as follows: DODI 500.2 refers to the phase leading to Milestone 0 as determination of mission need and Milestone 0 itself as concept studies approval.
- On page 113, the description of "Phase I, *Concept exploration and definition,*" is amended as follows: DODI 500.2 refers to this phase as Phase 0, concept exploitation and definition, which leads to Milestone I, concept demonstration approval.
- On page 113, the description of "Phase II, *demonstration and/or validation,*" is amended as follows: DODI 5000.2 refers to this phase as Phase I, demonstration and validation, which leads to Milestone II, development approval.
- On page 114, the description of "Phase III, *full-scale development,*" is amended as follows: DODI 500.2 refers to this phase as phase II, engineering and manufacturing development, which leads to Milestone III, production approval.
- On page 114, the description of "Phase IV, *full rate production,*" is amended as follows: DODI 5000.2 refers to this phase as Phase III, production and deployment, which may lead, as required, to major modification approval.
- On page 114, the description of "Phase V," is amended as follows: DODI 5000.2 refers to this as Phase IV, operations and support.

Since there may have been other important changes in research, development, and acquisition in the DoD and in the DON, the reader is urged to refer to DOD Instruction 5000.2, SECNAV Instruction 5000.2A, and subsequent guidance, and to the 12th and subsequent editions of the DON's RDT&E Acquisition Management Guide, when available.