CRM 90-16 / February 1990

OPNAV Functional Reorganization Study: Final Report

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ABSTRACT

This research memorandum analyzes the pros and cons of reorganizing the staff of the Chief of Naval Operations (OPNAV) along functional lines versus platform lines. CNA analysts drew upon extensive organizational literature and conducted a series of interviews with past and present personnel within OPNAV as a basis for this analysis. Several levels of problem severity are discussed and corresponding levels of reorganization postulated.

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EXECUTIVE SUMMARY

BACKGROUND

In December 1988, the Director of Navy Program Planning asked the Center for Naval Analyses (CNA) to analyze the pros and cons of organizing the staff of the Chief of Naval Operations (CNO) (commonly called OPNAV) along functional lines versus platform lines. The request came against a backdrop of growing controversy regarding the Navy's management of antisubmarine warfare (ASW) advanced technology. In December 1987, the Secretary of Defense had directed the Navy to centralize its management of research and development (R&D) for ASW advanced technology. In March 1989, the House Armed Services Committee received a report from a distinguished panel of experts contending that the organizational structure of OPNAV was a barrier to effective funding and development of progressive ASW systems.[1]

The current OPNAV structure (Spring 1989) includes three Assistant CNOs (ACNOs) who head undersea warfare, surface warfare, and air warfare. These ACNOs are commonly called Platform Sponsors because they are advocates of submarine, surface, and air platforms and systems. They have significant power. Critics have suggested, however, that their responsibilities and incentives are not conducive to fielding state-of-the-art integrated ASW systems. In 1988, the then-Under Secretary of the Navy suggested replacing these Platform Sponsors with Warfare-Area Sponsors (for example, ASW, antiair warfare (AAW), and strike warfare sponsors). This suggestion spurred the study request to CNA. Results were briefed in the late summer of 1989, and this memorandum provides final written documentation of the study.

APPROACH

OPNAV makes decisions regarding (1) current and programmed forces; (2) the technical R&D opportunities to pursue; and (3) how Navy missions, functions, and policies should be articulated. The organizational structure of OPNAV is clearly only one component, perhaps even a minor one, in contributing to how these decisions are made. OPNAV decisions on forces and R&D undergo subsequent approvals by the Department of the Navy Secretariat, the Office of the Secretary of Defense, the President, and Congress. Even if there were a direct link between organizational structure and decisions, no objective measure exists for determining whether OPNAV decisions are "right" or "wrong," because there are no definitive measures of force effectiveness or of the true military promise of emerging technologies. A confounding factor is the lack of explicit, concrete examples of perceived "wrong" decisions that could form the basis for case studies.

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1. See Office of the Vice Chief of Naval Operations, *CNO Top Down Study* (U), by Vice Admiral A. I. Baciocco, Jr., 13 Jan 1987.

This study therefore relied largely on personal interviews and reviews of past organization and management studies as a basis for analysis. Those interviewed included many current and former office-holders in OPNAV, the systems commands, the fleet, and the civilian U.S. Government (see appendix A). The interviews, which were conducted over a seven-month period (January-July 1989), yielded several complaints regarding OPNAV organization. The key complaints were the following:

- Platform Sponsors (OP-02/OP-03/OP-05) are too strong and too narrowly focused on the follow-ons to their own platform, i.e., the next attack submarine, guided-missile destroyer, or fighter aircraft. As a result, coverage of all the needs in a warfare area can be incomplete or inefficient.

- Sometimes there is no strong sponsor for (1) technical opportunities that logically fall between platform areas of interest or (2) systems or capabilities that cross platform boundaries (e.g., command, control, and communications).

- The business-as-usual approach in OPNAV tends to tie procurement funding to expensive follow-on platforms, whereas systems, sensors, and research, development, test, and evaluation (RDT&E) are more important.

- The Director of Navy Program Planning (OP-08) and the Director of Naval Warfare (OP-07) together provide inadequate integration across platforms within warfare areas and an inadequate basis for trading off force structure and modernization against readiness and sustainability.

- The principal line officer communities, which are defined by platforms, are too parochial and foster an inadequate Navy-wide viewpoint in senior officers.

Because a true output analysis was not possible, two other analytical approaches were adopted, albeit neither having the potential for being as definitive. First, to make up for the lack of an output measure, a parametric type of approach was adopted. Three levels of severity were postulated for the output problems, and then representative organizational options were analyzed. Although this approach leaves moot the question of whether organization is actually a cause of the problems, it does establish a context for analyzing the pros and cons of a functional organization.

The second approach was to conduct a normative analysis, using as a norm the proven organization principles established in the organization and management research literature. It is usually easy to critique <u>any</u>

organization when comparing it against an idealized norm, which underscores the limitations of such an approach. This analysis therefore took a commonsense position: if the output of an organization is "good" in some objective sense, then the organizational structure cannot be too far wrong regardless of what a normative analysis might suggest.

OPTIONS FOR REORGANIZATION

Functional Reorganization

The study first focused on a functional reorganization for OPNAV. Specifically the following would occur:

- Platform Sponsors would be replaced with Warfare-Area Sponsors (ASW, AAW, strike warfare, antisurface warfare (ASUW), amphibious warfare, and strategic warfare sponsors).
- Manpower and training responsibilities would be moved to Deputy CNO (DCNO) (Manpower, Personnel and Training).
- Maintenance (airfield and shipyard) and readiness responsibilities would be moved to DCNO (Logistics).
- Multiwarfare platform programs would be assigned to the most logical Warfare-Area Sponsor.
- Each platform community would be represented at the three-star level by a Warfare-Area Sponsor.

Table I summarizes the pros and cons of such a reorganization. On the pro side, warfare areas would receive primacy, and the act of reorganizing could help energize thinking about where the Navy is headed. There would likely be more cross-platform interaction and fewer obstacles for developing and fielding effective command, control, and communications (C^3) systems.

On the con side, if the long-term direction for the Navy is still not clear, a second reorganization may be needed once a direction does become clear. Several matters remain difficult under the new scheme: cross-platform and cross-warfare area tradeoffs, C^3/electronic warfare (EW)/space issues, and the integration across warfare areas to field coherent platforms.

Several issues concerning implementation loomed large: the sponsorship of multimission platforms, a ready supply of experienced individuals to serve as warfare sponsors, the potential for fragmented accountability over the lifetime of a system or platform, and the personnel turmoil associated with a reorganization. Finally, some critics argue that reorganizing for all warfare areas fails to single out ASW for special importance, which was one of the principal complaints of the current system.

Table I. Pros and cons of OPNAV functional reorganization

Pros	Cons
• New organization puts primary emphasis on entire warfare area.	• If long-range direction is still unclear after reorganization, another reorganization may again be needed.
• Reorganizations often stimulate fresh thinking.	• Allocating current platform monies to warfare areas is a major undertaking and not just a "detail."
• Reorganization sends a strong message regarding evolution to a new Navy.	• There is a need to integrate across warfare areas to assure viable platforms.
• Reorganization should force more cross-platform community interaction.	• There is a need to grow warfare-area specialists.
• Removing/diminishing platform-based power removes a barrier to effective handling of C^3.	• Fundamental C^3/EW/space issues are still difficult.
	• Cross-platform tradeoffs remain difficult.
	• Reorganization may no longer emphasize ASW.
	• Reorganization brings turmoil, which may affect community morale.
	• Reorganization brings potential for fragmented accountability; no more cradle-to-grave responsibility.

It is clear that a functional reorganization that does away with Platform Sponsors is a drastic change, which presumably presupposes that OPNAV has severe output problems. On balance, then, there should be

substantial cause[1] before undertaking a functional reorganization. If the Navy of the future is likely to continue to be dominated by ships, submarines, and sea-based tactical aircraft, then a platform-based organization is probably viable. If, on the other hand, fundamental changes face the Navy (e.g., if programmed forces lack capability against the threat, or technology drastically changes the shape of the Navy, or community parochialism prevents a technological revolution from being recognized), then a drastic reorganization may well be in order. The decision to reorganize would seem to hinge on whether fundamental change is in the offing.

Retaining Status Quo

At the other end of the spectrum--a situation with little or no problem with OPNAV decision-making--no reorganization would be called for, but several other actions might be warranted. In this status quo situation, the cooperative relationship between OP-07 and OP-08 that exists when preparing Program Objectives Memoranda (POM) would be allowed to mature. This process casts OP-07 in the role of honest broker and excludes the Platform Sponsors from the key decision-making forums. Power rests largely in the hands of DCNOs with cross-platform responsibility, while the Platform Sponsors have circumscribed power. The role of OP-07 as the approver of operational requirements (ORs) would be strengthened, and perhaps OP-07's role in rationalizing force decisions outside the Department of Defense (DOD) would be expanded. At a minimum, the existing power of OP-07 (in developing programming guidance, reviewing the POM, and approving new starts) should receive

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1. As an example of substantial cause, consider the following scenario in which technology would lead to dramatic changes in the Navy's dominant platforms and systems:

- Submarine missions would include strike warfare and ASUW, but a reduced ASW role.
- A smaller maritime patrol aircraft force would focus on surface surveillance, with a greatly reduced ASW role.
- The aircraft carrier's attack role would be concentrated in a few expensive stealth aircraft.
- Surface ships would have reduced silhouettes and limited area AAW, strike, and ASW capability.
- Carrier battle groups would have a primary role in low-intensity conflict.
- Space-based, fixed, and cruise missile systems would play a larger, perhaps dominant role.

wider publicity. Furthermore, the number of cross-cutting approvals to which the Platform Sponsor programs are subjected should also be highlighted. Even these modest actions would cause some concerns. Several interviewees worried that OP-07 could not be staffed adequately to speak authoritatively on operational requirements, which could also hold true for the job of rationalizing forces. In the latter case, it is also prudent to worry that the advocacy role for OP-07 could tend to be all-consuming.

Strengthening the Warfare-Area Perspective

Many of the interviewees thought that a functional reorganization was too drastic a measure but still worried that the present situation called for some change. As a result, an intermediate case between the two extremes was considered. This case addressed moderate problems with OPNAV's output that could be reduced by strengthening OPNAV's warfare-area perspective. Organizational structure, rank structure, assignment of quality officers, promotion opportunity from the different offices in OPNAV, changes in the key decision processes, and the frequency of personnel rotation are all possible areas for improvement. Clearly, a wide range of generic changes could be constructed that would strengthen the warfare view.

Two options were considered that included strengthening OP-07 by assigning strong officers and increasing promotion opportunity. The two options differ in the way they would change decision processes. The first option would give OP-07 Program Sponsor responsibilities for certain RDT&E,N monies: 6.2/6.3a/6.3b (Exploratory/Advanced Development) and perhaps 6.4/6.6 (Engineering/Operational Systems Development) as well. This shift in responsibilities would come largely at the expense of the Platform Sponsors, although some would also come from the Director, RDT&E (OP-098). The spirit of the change would be to place responsibility for new starts, which means early R&D money, in the hands of an actor with a cross-platform viewpoint. In the same spirit, the second option would give OP-07 programmatic authority for the warfighting portion of the Navy program (procurement accounts and R&D). This would represent a shift of responsibility from OP-08 to OP-07.

Although both options are attractive in that they strengthen the warfare-area viewpoint, there are aspects for concern. Some have argued that putting exploratory development money in the hands of OP-07 (the first option) would tend to give basic research a short-term view versus a long-term view. Others worry that the second option (1) could potentially set up a conflict between OP-07 and OP-08, (2) would not yield an integrated program below the CNO level, and (3) might make tradeoffs between readiness funding and forces funding more difficult.

FINDINGS

The normative analysis resulted in the following findings:

- The perceived organizational problems stem from fundamental disagreements over current and programmed force structure and the research and development of new technologies.

- Although the Platform Sponsors are powerful actors in OPNAV, they are by no means all-powerful "barons." They are probably strongest in acquisition (pre-milestone zero), but their power is circumscribed in the POM process and is only advisory power in the post-POM defense/budget processes. Platform Sponsors are among the few actors who can provide continuity throughout.

- The strategic (or long-range) planning function is weak, and perhaps a more formal planning mechanism should be established.

- There is a need for more effective sponsorship of technological possibilities that fall outside the Platform Sponsor's sphere of interest. These ideas need to get a fair hearing and compete for funding on a more even basis.

- The concern regarding the narrow breadth of Navy flag officers and their parochialism is widespread. Cross-platform and warfare-area experience needs to be increased to provide flag officers who can perform effectively in the new roles.

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INTRODUCTION

BACKGROUND

In December 1988, the Director of Navy Program Planning asked the Center for Naval Analyses (CNA)[1] to analyze the pros and cons of reorganizing the staff of the Chief of Naval Operations (CNO) (commonly called OPNAV) along functional versus platform lines. This request came against a backdrop of growing controversy regarding the Navy's management of antisubmarine warfare (ASW) advanced technology. In December 1987, the Secretary of Defense had directed that the Navy centralize its management of research and development (R&D) for ASW advanced technology. A follow-on Blue Ribbon Task Force, established by the CNO to develop implementation options, was concerned with the relationship between emerging Navy requirements and the application of these R&D funds. Subsequent dialogue between the civilian side and uniformed side of the Department of the Navy (DON) concerned the existence of a wider spread ASW investment problem and how to address such a problem organizationally.

In March 1989, a House Armed Services Committee received a report from a distinguished panel of experts contending that the Navy's ASW development was in a state of disarray, that dominance of the CNO's staff (OPNAV) by Platform Sponsors (for surface, air, and subsurface platforms) was a contributing factor, and that the Navy should establish an ASW czar for ASW matters at the three-star level [1]. In 1988, the then-Under Secretary of the Navy had suggested replacing these Platform Sponsors with Warfare-Area Sponsors. These suggestions spurred the study request to CNA. Results were briefed in the late summer of 1989, and this memorandum provides final written documentation of the study.

OPNAV tasking especially emphasized the increasing need for cross-platform integration at the operating level. Cross-platform integration is believed to be particularly needed in ASW but may soon become an obvious need in antiair warfare (AAW) as well. In both warfare areas, the driving factor is a relative reduction of individual platform capability against projected threats; that is, the Navy is perceived to be moving from a period when individual platforms have significant capability, and are perhaps not so dependent on other forces, to a time when coordination among platforms will be required to achieve a significant capability. This transition brings with it a natural heightening of the importance of command, control, communications, and intelligence (C^3I).

The Navy has not been idle during this evolution. Recognizing the potentially insular character of a single-platform view, the CNO had created a three-star flag position, Director of Naval Warfare (OP-07), in OPNAV in 1980 for balance. In succeeding years, CNO experimented

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1. A glossary of abbreviations and acronyms is provided at the end of this document.

with whether program sponsorship (during the acquisition process) was an appropriate task for this staff element. Most recently, the decision has been to divest OP-07 of program sponsorship responsibilities to (1) enhance his status as an honest broker and (2) prevent program sponsorship activities from encroaching upon honest broker activities. Furthermore, OP-07's position has been strengthened by formalizing his special advisory standing with the Director of Navy Program Planning (OP-08) during the Program Objectives Memoranda (POM) process and by having him approve operational requirements (ORs) during the acquisition process.

APPROACH

To accomplish its analysis, CNA consulted the existing management literature for applicable frameworks, reviewed previous studies of OPNAV structure, and conducted more than 70 interviews with holders of current and past key OPNAV jobs and with outside observers. The relevant management literature covers the areas of organizational structure, strategic management, and innovation. Recent studies of OPNAV include those described in [2], [3], and [4]. The interviews concentrated on identifying the perceived problems that an OPNAV reorganization would be expected to fix, the dynamics of OPNAV decision-making, and perceptions regarding environmental factors (technological progress, Congressional relations, and personnel issues).

ORGANIZATION OF PAPER

Subsequent sections of this report provide details of CNA's analysis. The next section presents a summary of the complaints that have been leveled at the OPNAV structure and a discussion of how to analyze these organizational issues. The organizational structure of OPNAV is then described as it exists at the time of writing and includes the patterns of relationships, authority, communications, and decision processes. A section then follows that summarizes the management literature and applies it to the Navy's predicament. This section concludes with two brief case histories relevant to Navy organization. The last section presents analytical results of two types: (1) results of an "output" analysis that resembles a sensitivity analysis and (2) results of a "normative" analysis that comes from applying the standards derived from management research. Two suggestions for necessary additional research are also presented. Appendix A lists the persons interviewed for this study, and appendix B provides a background in classical and behavioral organization theory used in this research.

PERCEIVED PROBLEMS AND ANALYTICAL APPROACH

ORGANIZATION OF OPNAV

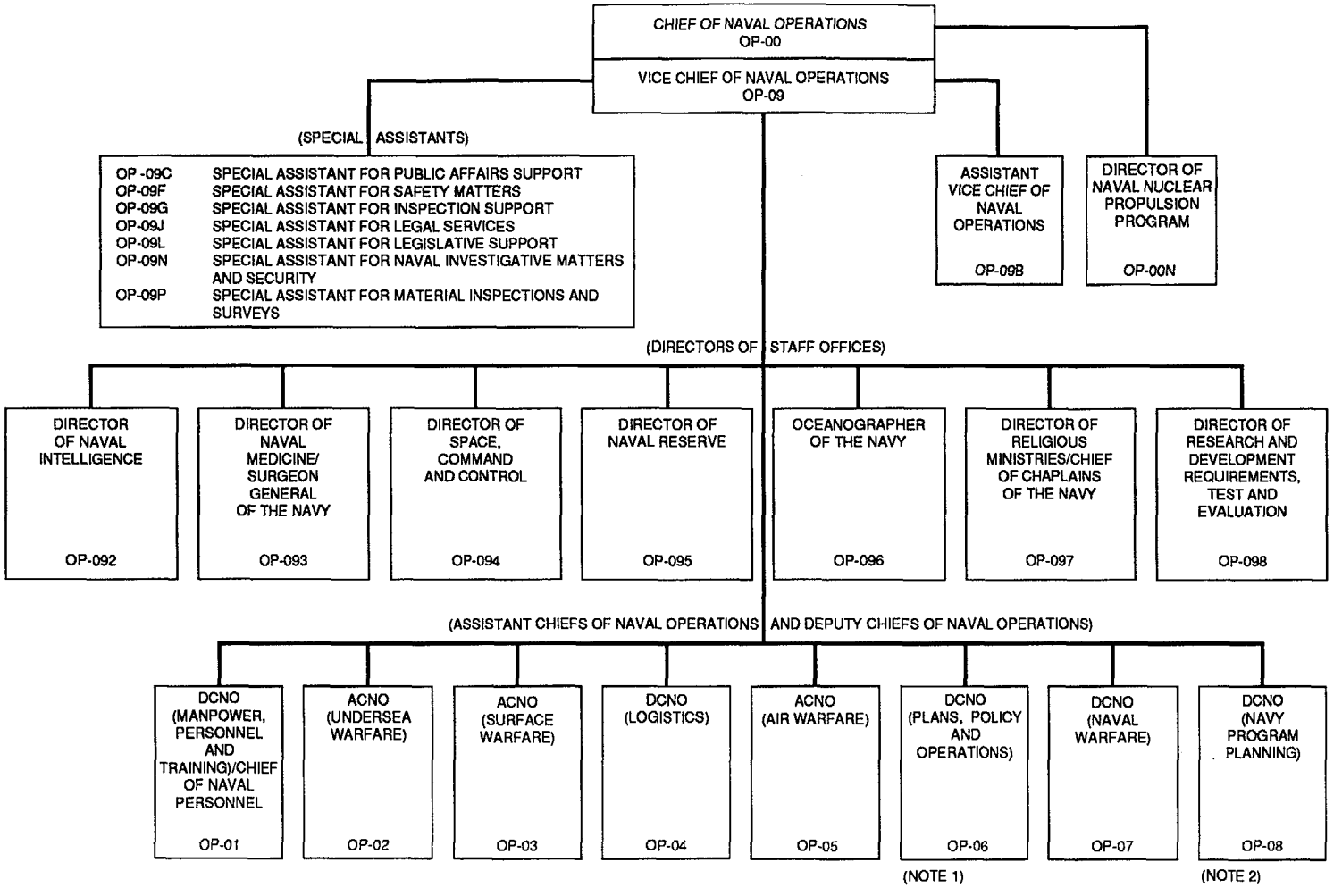
The OPNAV staff currently (mid-1989) consists of some 1,800 individuals headed by the Chief of Naval Operations (CNO) and the Vice CNO (VCNO), both four-star admirals. The staff includes (1) five three-star Deputy CNOs (DCNOs), who oversee manpower/personnel/training, logistics, plans/ policy/operations, naval warfare, and program planning, and (2) three Assistant CNOs (ACNOs) (also three-star admirals), who head undersea warfare, surface warfare, and air warfare. The ACNOs are commonly referred to as Platform Sponsors because they serve as advocates for their platforms or systems in OPNAV decision processes. All eight DCNOs and ACNOs have extensive support staffs. In addition, seven director-level staff elements are headed by either a two- or three-star admiral, again each with a supporting staff. A number of special assistants round out the OPNAV staff. Figure 1 is the current organizational chart for OPNAV.

PERCEIVED PROBLEMS

CNA conducted detailed interviews to identify the "problems" a reorganization might "fix." Appendix A lists the interviewees and the relevant offices held. A synthesis of the major complaints identified in these interviews, plus those contained in recent reports, is as follows:

- The platform "barons" (OP-02/OP-03/OP-05) are too strong and too narrowly focused on their own platform follow-ons. Together with the systems commands (SYSCOMs), their "solutions" to the growing threat always seem to focus on the next generation of current systems or platforms, i.e., there is a lack of innovative thinking in operational requirements (ORs) and in Development Option Papers (DOPs).

- Programmed forces will not be able to handle the projected threat (e.g., SSN-21s/LRAACA/DDG-51s in ASW or Aegis and F-14Ds against low observable targets). The increasingly capable threat requires nontraditional technological solutions for which there are sometimes no natural sponsors. In particular, the Navy is not vigorous enough in pursuing promising nonstandard technological solutions in ASW. Expensive follow-on systems and platforms leave insufficient funds for costly prototyping and testing programs in the revolutionary areas.



NOTE 1: DESIGNATED AS PRINCIPAL STAFF EXECUTIVE FOR JCS MATTERS
NOTE 2: DESIGNATED AS PRINCIPAL STAFF EXECUTIVE FOR OTHER THAN JCS MATTERS

Figure 1. OPNAV organizational chart as of mid-1989

- The Navy has "holes" in its current capability that result from a lack of effective advocacy (mine warfare, C^3, and electronic warfare (EW)).

- The Navy's force structure can't be sustained with the currently programmed procurement; hence, there is inconsistency in force structure and procurement.

- Current and programmed forces are too focused on a war with the Warsaw Pact nations and not enough on a low-intensity conflict in the Third World.

- The Navy R&D community has not been effective in transferring promising technologies into workable systems.

- Not enough consideration is given to tradeoffs between procurement and RDT&E and between Operations and Maintenance, Navy (O&MN) and Military Personnel, Navy (MPN). OP-07 is focused entirely on the warfighting Resource Allocation Display (RAD)--OP-81 does the readiness appraisal.

Even if only some of these complaints are true, it would be a serious matter.

ANALYTICAL APPROACH

The most important measure of an organization's effectiveness is the quality of its "output." As an organizational entity, OPNAV plans, decides, sets policy, and advocates. As such, its "output" consists of Program Objectives Memoranda (POM), requirements statements (tentative operational requirement (TOR)/operational requirement (OR)), strategic planning (in the business sense), Navy policy, and day-to-day management decisions. Past OPNAV outputs are reflected, then, in current forces and their effectiveness and in the current Navy program (planned force structure and modernization, R&D initiatives, and readiness and sustainability funding). On this basis, one would point to problems associated with current forces and the Navy program as possible evidence of OPNAV organizational problems. This linkage is not absolute, however, because organizational structure is only one factor contributing to OPNAV output, perhaps even a minor factor.

If the current and programmed forces, development for future forces, and research into technological possibilities are about "right," there is no concrete basis upon which to question the organizational structure. After all, the best one can hope for is that an organizational structure provides an environment for producing the right output. If the output is right, the organization must be at least about right. If the output is "wrong," organizational structure could be a contributing factor.

This type of reasoning suggests that the real disagreements must be over the following issues:

- The efficacy of past budgets in addressing the Navy's most pressing needs
- The warfighting effectiveness of current, programmed, and developmental systems and platforms
- The optimal funding level of programmed/developmental systems and platforms, plus research in the technology base
- The true promise of different technological possibilities
- The Navy's true missions deriving from national strategy.

These issues are extremely difficult to resolve. Objective, credible yardsticks do not exist, and, as a result, there is little objective evidence to shed unequivocal light on them.

Because a true output analysis was not possible, two other analytic approaches were used. First, to make up for the lack of an output measure, a parametric approach was adopted. Three levels of problem severity were postulated and organizational options analyzed for each. Although admittedly not satisfactory, this does provide a framework for discussing the pros and cons of a functional organization.

The second approach was to conduct a normative analysis. The normative approach compares the organization in question to some norm or to an idealized organization. Because it is relatively easy to find fault with organizations and decision processes by comparing them to some theoretical norm, this approach cannot be conclusive. By ignoring output and the true role of organizational structure in determining output, the normative approach is at best suggestive, but this approach does constitute a useful complement to the parametric approach outlined above. Accordingly, a normative analysis is also presented. The organizational principles found in the the management literature are standards that were applied to OPNAV's organization. The disciplines of interest are organization theory and empirical studies, plus a budding literature on innovation.

CURRENT ACTORS, ORGANIZATION, AND DECISION PROCESSES

To analyze the OPNAV organization, one must begin by examining how OPNAV operates and where the power lies. The current OPNAV organizational structure (pattern of relationships, authority, and communications) and decision processes (planning, programming, and budgeting system (PPBS) and acquisition) are complicated. Merely inspecting organizational diagrams and reading job descriptions and PPBS/acquisition instructions will not suffice.

ORs AND MILESTONE ZERO

The diagram in figure 2 helps illustrate the two major Navy decision processes: acquisition and PPBS. In theory, the acquisition process begins with a "requirement" derived from recognition of fleet deficiencies, evolving threat capabilities, or a change in Navy roles or missions. The requirement would be recorded in a tentative operational requirement (TOR). The TOR would be passed to the SYSCOMs, who would then develop options for ways to satisfy the requirement; this step seldom occurs in practice [5]. Once an option is decided upon, a military needs statement (MNS) or OR will be considered by a decision board, with the particular board determined by the size of the program. The Defense Acquisition Board is the highest such board. It is chaired by the Deputy Secretary of Defense and handles billion-dollar programs. A Navy Program Decision Memorandum (NPDM), chaired by the Under Secretary of the Navy, handles smaller programs. The decision of these boards to go ahead with concept exploration is referred to as "milestone zero."

The program will then progress through subsequent milestones covering demonstration and validation, full-scale development, and production and deployment decisions as development proceeds. The Program Sponsor, usually an OPNAV Platform Sponsor, will put money for the program in the Navy POM at milestone zero. The Packard Commission [6] contended that system cost does not play a significant enough role in the later milestone decisions: the tradeoff between additional capabilities and their costs is not examined. Instead, a rigid set of "requirements" tends to drive the process. In their view "...user pull often leads to...the inclusion of features that are desirable but whose cost far exceeds their value....Technology push...is no less prone to gold plating....System specifications effectively become a surrogate for overstated military requirements, which tend to fade from view" [6].

A key element of power is the Platform Sponsor's ability to devote staff and three-star attention to new ideas prior to milestone zero. If one of the three Platform Sponsors or the Director of Space, Command and Control (OP-094), cannot be persuaded to investigate the idea, it is unlikely to be considered for inclusion in the Navy program; that is, the Platform Sponsors must decide to sponsor an idea in order for the acquisition system to even consider it.

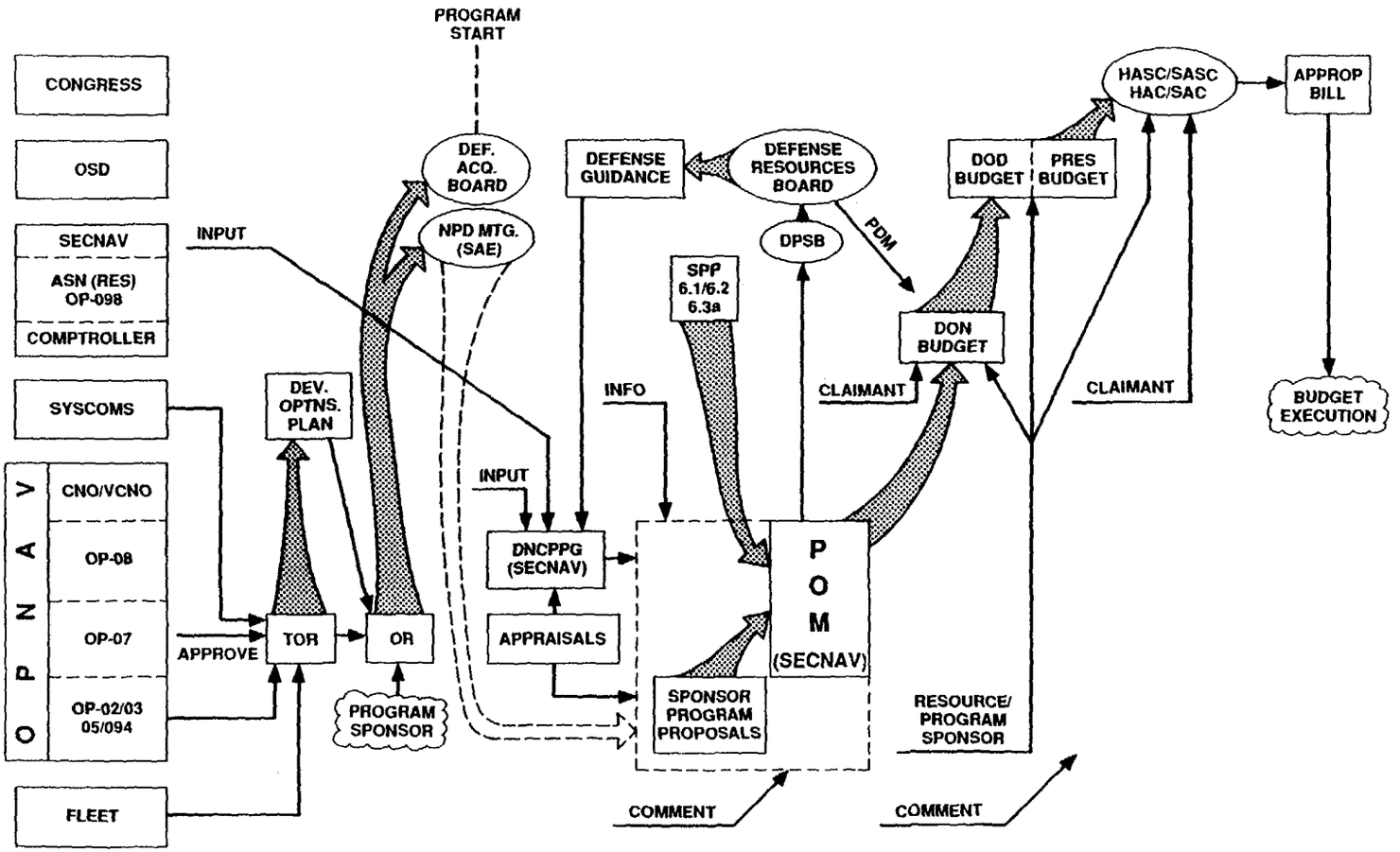


Figure 2. Major actors and events in Navy acquisition/PPBS process

POM INITIATION

The biannual update of the Navy Five-Year Defense Plan (FYDP) (which precedes the President's budget) begins with the Secretary of Defense's Defense Guidance (DG). The DG establishes a macro-level force versus strategy correspondence and allocates dollar targets to the services.

In OPNAV, OP-08 drafts a Department of the Navy Consolidated Planning and Programming Guidance (DNCPPG), which is signed by the Secretary of the Navy (SECNAV). To construct the document, OP-08 begins with a Summary Warfare Appraisal from OP-07 and then applies SECNAV/CNO posture statements, the Defense Guidance, and other SECNAV/CNO policy statements from speeches, and so forth.

The resource sponsors (Platform Sponsors) are not expected to follow the DNCPPG to the letter, but rather the DNCPPG constitutes guidance within which the sponsors construct balanced programs. OP-08 develops fiscal guidance for the sponsors by beginning with the most recent FYDP plus a DON dollar figure allocated by the Office of the Secretary of Defense (OSD). The OSD allocation will generally involve a change from the previous DON FYDP.

To allocate the impact of this change, OP-08 first removes the DON portion of the National Foreign Intelligence Program (NFIP) dollars. Next, the noninvestment portion (approximately 60 percent) is adjusted on a pro rata basis, i.e., the nonprocurement/RDT&E components are adjusted in a fair-share fashion. The procurement and RDT&E portion (approximately 40 percent) is adjusted in accordance with OP-08's interpretation of the Summary Warfare Appraisal and the DNCPPG.

This process yields top-line numbers for each of the Platform Sponsors. It is important to note that OP-08 will not allow the Platform Sponsors to trade off Shipbuilding and Conversion, Navy (SCN), or Aircraft Procurement, Navy (APN), programs against the non-SCN/APN programs. Other Procurement, Navy (OPN), and Weapons Procurement, Navy (WPN), however, can be traded off.

The Platform Sponsors then adjust their current program to reflect the DNCPPG, approved initiatives from the acquisition process, and emerging Fleet readiness requirements. Each Platform Sponsor presents his program in a document called the Sponsor Program Proposal (SPP).

SPPs AND POM REVIEW

For the submarine program, the SPP for OP-02 issues guidance to ASW claimants, usually two to five pages, and then allocates funding to those claimants (Strategic Systems Project Office (SSPO), Naval Sea Systems Command (NAVSEA), and Space and Naval Warfare Systems Command (SPAWAR)). This accounts for about 95 percent of OP-02 resources. In December, the claimants brief OP-02 on their plans, which the OP-02

Branch Heads then use as the basis for a strawman budget. This is developed until the February timeframe, when OP-02 conducts a Sponsor Investment Strategy Review. Two weeks later, the OP-02 SPP goes before the Program Development Review Committee/Program Review Committee. So, the OP-02 claimants have made a major input to programming early on.

For the air program, resources are allocated to OP-05 working groups that develop the new program. Working groups cover flight-hours, logistics, the four warfare areas (one for each), training, and carriers and airstations. The warfare areas together account for about a third of OP-05's resources. The working groups receive "fair share" adjustments and then develop a prioritized list above a "core" program. The working groups then present their pieces of the program to an OP-05 one- and two-star review group before it goes to the ACNO himself. The principal claimant (Naval Air Systems Command (NAVAIRSYSCOM)) is limited to providing cost information on request. (It is interesting to note that OP-05 observed his resources to be the same as those allocated to him in the Summary Warfare Appraisal.)

In OP-03, the dollar control received from OP-08 is allocated to Divisions and in some cases Branches for POM development. The Divisions and Branches construct a strawman budget using the SYSCOM claimants only for system costing. The claimants do not present a plan to OP-03. The individual pieces are consolidated for one- and two-star review prior to being presented to the ACNO.

Currently, it is fair to say that OP-08 and OP-07 jointly review the SPPs, either in a three-star Program Review Committee (PRC) or in a two-star Program Development Review Committee (PDRC), depending on timing. A formal response from OP-08 to each sponsor, the so-called "ZOW" process, is chopped through OP-07. The essence of the SPPs may then go to the CNO/VCNO informally. The Draft POM, including amended SPPs, then goes before the DON Program Strategy Board (DPSB), which consists of SECNAV/UNDERSECNAV; CNO/VCNO; OP-08; OP-07; Commandant, Marine Corps (CMC); Assistant CMC (ACMC); and the Assistant Secretaries of the Navy (ASNs). The DPSB is the final approval authority on the POM within DON.

It is important to note that OP-07 is asked to select offsets for any additions to the procurement/RDT&E part of the POM that result from DPSB deliberations. A Special Projects Review Group (SPRG) meets periodically to review Special Access Program (SAP) status. Platform Sponsors are members of this group. The internal POM review process remains flexible so that it can accommodate the key personalities involved. For example, the Under Secretary of the Navy views draft SPPs early in the POM-90 process to gain an appreciation for how the programs are shaping up.

The POM simultaneously goes to OSD for review and to the Navy Comptroller (NAVCOMPT) for budget scrub. The results of the OSD program review are promulgated in Program Decision Memoranda (PDM). Budget

submissions from Navy claimants to NAVCOMPT contain additional detail and revised estimates. Adjustments made during the NAVCOMPT budget scrub reflect both the PDMs plus concerns about executability, the political climate, pricing, and a changed top line. The Navy budget then makes its way through OSD/Office of Management and Budget (OMB) budget scrubs, which result in Program Budget Decisions (PBDs). The President's Budget then undergoes Congressional review and approval. Both OPNAV planners (sponsors) and SYSCOM executors (claimants) could testify to Congress during these reviews.

DISTRIBUTION OF POWER

It is instructive to summarize the involvement of each of the major actors. Platform Sponsor (OP-02/OP-03/OP-05) influence in the acquisition process stems from their roles in requirements definition, collaboration with the SYSCOMs in DOPs/ORs, and program sponsorship during the early acquisition process. During POM preparation, the Platform Sponsors prepare the SPPs. Post-POM, they defend the Navy budget during budget scrubs and Congressional hearings and then monitor execution. Platform Sponsors also provide "information briefings" to Congress regarding specific programs. Of note during SPP preparation, the Platform Sponsors are in a position to effect some tradeoffs between forces and readiness.

In the acquisition process, the Director, Naval Warfare (OP-07), is an "approval" authority for TOR/ORs. He directs construction of the Warfare Area Master Plans through the warfare area teams, and he authors the Warfare Area Appraisals (in particular, the Summary Warfare Appraisal). For POM preparation, OP-07 provides advice on program prioritization to OP-08 and the CNO, so the extent of OP-07's power is at the pleasure of OP-08/CNO. Post-POM, OP-07 provides advice to OP-08/CNO (on request) during budget scrubs and the budget defense.

The DCNO Navy Program Planning (OP-08) is the CNO's chief assistant on non-Joint Chief of Staff matters. He runs the POM process primarily through the Director of General Planning and Programming (OP-80), and his Director, Fiscal Management (OP-82), is dual-hatted to the Secretary of the Navy in the budget process as the Director of Budget and Reports (NCB). Through his Director of Resource Appraisal (OP-81), OP-08 is evaluator of the Navy's O&MN/Manpower, Personnel, Training (MPT) program and of tradeoffs between O&MN/MPT and Procurement/RDT&E. He has little distinctive role in acquisition. A perception from interview comments is that the OP-08 organization has become more focused on OSD/OMB/ Congressional defense of the Navy program and budget in recent years.

The Systems Commands (SPAWAR, NAVSEA, NAVAIR) develop options for TOR/OR during the acquisition process and will provide platform/system costing. They support the Platform Sponsors in SPP preparation, although the extent of the support depends on the sponsor. Post-POM, they prepare detailed budget submissions as a Navy claimant and testify to Congress in defense of the budget. They are the primary executors of

the Navy investment budget. The R&D community, Assistant Secretary for Research, Engineering and Systems (ASN(RES)), OP-098, Office of Naval Research (ONR), and Naval Laboratories play a key role in generating, or at least recognizing, the "bright ideas" that solve Navy problems. The Director, RDT&E (OP-098), is the Program Sponsor for the technology base (6.1 and 6.2) as well as parts of the technology transition (6.3a) programs. The R&D community personnel are the in-house technical talent at both research and management levels.

In principle, effective force planning relative to the threat requires that those knowledgable of the technology, the warfighting requirements, and program management work in collaboration. This means that the R&D community, OPNAV, and the SYSCOMs need to work as a team. The split of responsibilities between a civilian secretariat (with acquisition and RDT&E responsibility) and a uniformed OPNAV (responsible for requirements, the POM, and administration) appears to be a fact of life, although there will be an ebb and flow of power depending on personalities.

Industry, however, is not organized along warfare-area lines--industry builds "things" and so is organized more like the Platform Sponsors are. For example, one sees aircraft, ship, and submarine builders--not ASW, AAW, antisurface warfare (ASUW), or strike warfare manufacturers. No single company is building for an entire warfare area in a coordinated fashion, although some conglomerates may serve more than one platform area. The creativity and innovation in private industry, the source of many bright ideas for new systems, is therefore platform related, which tends to reinforce the power of the Platform Sponsors. If there were Warfare-Area Sponsors instead, the ship and aircraft industries would have to interact and coordinate with several sponsors. Sponsorship of multi-warfare-capable platforms might suffer.

Platform Sponsors currently lend important continuity to overall decision-making. They participate heavily in development, programming, and budgeting and they monitor execution. This is important because the actors with primary responsibility shift with the different phases of the process. During development, the R&D community and the Systems Commands have the lead. During programming, primary responsibility is passed to OP-08, OP-07, and the Platform Sponsors. During budgeting, the Secretariat, OP-82, and major claimants (SYSCOMs) then have the lead, and the SYSCOMs execute the budget. Clearly, the provider of continuity brings an important perspective to the problem, and the broader the perspective, the better. Broad vision is particularly important in the system development and programming processes in order to: (1) make tradeoffs across platforms, warfare areas, and appropriation categories; (2) fund support systems at optimal levels; and (3) recognize and effectively consider nontraditional technologies.

Fundamental technological and tradeoff questions are both difficult and complex. An advocacy process therefore guides decision-making, causing the best programs to survive and the weaker programs to fall by

the wayside. A side effect of this advocacy process, however, is that decisions tend to get pushed higher up; hard decisions and tradeoffs tend not to be made below the four-star level. When no technological solutions to a problem appear on the horizon, OPNAV needs to pursue many options, and the advocacy process helps ensure that diverse possibilities are vigorously explored and examined. Some claim, however, that the pressure of the advocacy process leads the platform "barons" to downplay threat capabilities when assessing their own platform effectiveness (during either the acquisition or POM process deliberations). Their incentive is to present as favorable a case as possible regarding their platform and thereby maximize the chances of it receiving approval. True or not, in an organization made of up Warfare-Area Sponsors, the same would probably occur one step down, within a warfare area. Furthermore, there would be corresponding incentives to overstate the threat in a warfare area, thereby presenting a more urgent Navy problem requiring funding.

THEORY

In the language of organization theory, how should the Navy's top management be organized? Although literature on the subject of top management is slim, literature on the broader topics of management and organization is vast. Because of the type of complaints voiced, perhaps the question of how top management should be organized is best understood by examining the Navy's mechanisms for strategic planning and how it adapts to technological change.

One goal of strategic planning of an organization is the charting of a long-range course for the organization. Logically, the DNCPPG would be the vehicle for conveying the direction to OPNAV and the Navy and for recording top management's consensus for long-range planning. The PPBS process is too cumbersome, formal, and encompassing to convey direction in strategic long-range planning, but strategic planning should still be closely linked to the reality and concreteness of the PPBS. It is useful to first review some basics and then address the long-range planning and innovation issues.

ORGANIZATION THEORY

In organizing top management, Peter Drucker [7] directs one to decide on the enterprise's major activities and then include in "top management" an individual who would be responsible for each activity. For the Navy, one could define the major activities in terms of platforms, warfare areas, or missions, with the current emphasis being on platforms. This has made good sense for the Navy as a whole, but need not have a strong implication for the organization of top management. One suspects that there will always be a tradeoff between a planning focus, i.e., the uses to which the forces are put (missions and warfare areas), and a platforms and systems focus, i.e., a procurement focus.

Lawrence and Lorsch [8] identify the basic tension in organizational structure as stemming from the desire to differentiate activities (to specialize) to achieve efficiency, which then brings with it the need to integrate activities and decisions across the specialized subunits. In the private sector, the subunits usually are functional departments (e.g., sales, manufacturing, design). To produce and sell distinct products, then, requires integrating activities across these functional departments. This tension has led some to use matrix structures in which a production organization is overlaid on the departmental organization.

OPNAV's current organization is a mixture of matrix and functional components. Examples of functional components are the DCNO, Manpower, and DCNO, Logistics. The Platform Sponsors (with OP-094) and OP-07 constitute a warfare matrix organization; OP-08 discharges the integration role between the warfare matrix and the other two functional components. The DCNO, Plans/Policy, serves almost in a separate advisory

role in this context. Unfortunately, given the three-dimensional nature of the Navy (platforms, warfare areas, and missions), there is no single "right" organization that emerges from the Lawrence and Lorsch analysis. Integration across platforms and warfare areas will always be required. The question is really at what level that integration is best achieved. (Appendix B contains a more detailed summary of classical and behavioral organization theory.)

Shrivastava [9] observes that traditional organization theory applies to the enterprise as a whole, not necessarily to the organization of top management. He contends that top management need not be structured like the organization as a whole. Top management's tasks are ill structured, complex, and highly interdependent. Effective top management organizations learn to predict changes in their environment, identify the impact of those changes, and cope through appropriate strategic responses. The basic design variables for top management should thus be: the interpersonal relationships in management teams, structuring to facilitate consensual understanding of strategic problems, flexibility to allow for shifts in leadership to permit the individual with the technical expertise or knowledge base to lead on a particular decision, and integration of the top management team into a working unit.

Shrivastava's approach stresses the human aspects (power and influence) of top management and, by implication, deemphasizes the formal structure. This would be consistent with two popular maxims: (1) reorganizing doesn't solve problems, people solve problems; and (2) the staff structure should suit the needs of the executive being supported rather than being imposed from the outside.

STRATEGIC MANAGEMENT

For strategic or long-range decision-making, the theory until recently was that organizational structure helps implement corporate strategy, which suggests that determination of strategy precedes determination of the organizational structure [10]. Recently, however, researchers have argued that although structure is a tool for implementing strategy, it can also facilitate, constrain, or simply shape the outcomes of the strategic decision process.

Frederickson [11] characterizes the strategic decision process along six dimensions: initiating the decision process, the role of goals, the relationships between means and ends, the explanations given for strategic action, the comprehensiveness of decision-making, and the comprehensiveness of integration across organizational components. He then analyzes the strategic decision process for the three main structural types found in the literature: (1) "simple" (centralization dominant), (2) "machine bureaucracy" (formalization dominant), and (3) "professional bureaucracy" (complexity dominant).

Centralization refers to the concentration of decision-making and evaluation of activities. Usually, larger organizations are less centralized than smaller organizations. Formalization refers to the extent to which an organization uses rules and procedures to prescribe behavior. Complexity refers to the extent to which the entity is composed of many integrated parts. An organization that has many levels, broad spans of control, and is distributed over many geographic locations would be deemed complex.

The Navy seems to combine aspects of the machine (formalized) and professional (complex) bureaucracies. Its formalization is evidenced by the rank structure, military formalisms, rules and regulations (both in the Fleet and in acquisition, although less than in other services), a management structure dominated by the PPBS and acquisition processes, and the legal environment of government (to assure fairness, equitability, and control). Its complexity is evidenced by many parts (fleets, shore establishment, SYSCOMs), horizontal differentiation (operational, administrative, procurement, support dimensions), vertical differentiation (many layers), and geographical dispersion (world-wide). Frederickson's analysis would then predict that the Navy's strategic decision-making process would exhibit the following deficiencies:

- It is initiated only in response to problems or crises.
- The initial stimulus for strategic change will not be recognized as "strategic" in nature; sometimes the stimulus will be ignored because of "parochial preferences."
- The strategic decisions will usually address remedial goals, and means will sometimes displace ends.
- The large number of actors and the need for consensus increase the likelihood that strategic decisions will not achieve Navy-wide goals (lowest-common-denominator problem).
- Strategic decisions will be incremental and the result of internal political bargaining.
- Biases in parochial perceptions will be the primary constraint on the comprehensiveness of the strategic decision process; there will be a low level of integration across organizational elements.

These predicted deficiencies bear a striking resemblance to many of the perceived problems described in the interviews conducted, as noted earlier. This coincidence of interview perception and organization theory suggests that a strengthening of the Navy's strategic planning process is worth considering.

A final point from the literature is worth mentioning. Small, isolated "planning groups" reporting to a chief executive officer (CEO) usually become too distant from real-world decision-making and lose touch. Strategic planning seems to work best when the principal actors are involved. For the Navy, this would mean that the CNO and key OPNAV three-star admirals should be involved.

INNOVATION AND ORGANIZATION

Structuring to encourage innovation is a long-standing problem of ever-increasing importance. Galbraith [12] contends that industry has a poor record in innovations, with most major technological changes coming from outside the dominant large corporations in an industry. Because the innovating task is fundamentally different from the operating tasks, he argues that there is a need for a separate organization to manage the innovation process. Such an organization would have four elements: a structure, transition process, reward systems, and, of course, people.

The structure must succeed in differentiating the innovation task from the operating task and provide for three functions: idea generation, sponsoring of idea development, and orchestration through transition. Separation at the idea-generation level is often accomplished by establishing a separate subunit devoted to creating new ideas. The head

tions are need-oriented. Galbraith contends that innovation is more likely to occur when "knowledge of technologies and user requirements are combined in the minds of as few people as possible--preferably that of one person." A high-ranking "orchestrator" makes the short-term/ long-term funding tradeoffs; his job is to ensure that there is a way for ideas to be generated, that there are sponsors to develop and push

On the minus side:

- Orchestrators (OP-02/OP-03/OP-05/OP-094) have circumscribed spheres of responsibility, leaving gaps in sponsorship and weak sponsorship of overarching systems.
- The reward system for innovation is not strong, especially since innovation threatens the status quo.
- The Navy grows few idea generators, especially ones who know the user's perspective.

On balance, Galbraith's theory is useful at highlighting weaknesses in the Navy's innovation organization, and it matches the contents of the interviews reasonably well.

Additional perspective comes from recent empirical research on innovation by Quinn [13]. First, small companies appear to be better at innovation, he says. One reason is that the larger companies have a larger task: produce the more complex products and systems society expects. This makes innovation more difficult for larger companies. The hallmarks of successful innovation in small companies include a "needs orientation" that is hand in hand with customer demand, a reputation as being pioneers in technology and fanatics in solving problems, long time horizons (essentially "irrational" from a present-value viewpoint), low early costs, multiple approaches to problem solution, flexibility and quickness in decision-making (undeterred by committees, board approvals, and other bureaucratic delays), and the presence of tangible personal rewards for successful innovation.

For a large company seeking to be innovative, Quinn believes it must adopt the natural advantages of a small company through a variety of artificial methods. Most notably, Quinn advocates the use of "skunkworks"--small teams of engineers, technicians, designers, and model workers who operate with no restrictions in moving from idea to prototype. Skunkworks would overcome a variety of constraints, particularly the "red tape" associated with a large bureaucracy, and thus would ensure a quick movement from paper studies to physical testing. Quinn also calls for large organizations to use multiple approaches in pursuing and developing ideas because several competing prototypes will be produced in parallel.

CASES

This section concludes with two brief case histories from Navy experience. The first covers the development and introduction of fleet ballistic missile submarines (FBMs); the second covers the centralized management of ASW programs in the Navy during the 1960s.

The FBM Program

Raburn [14], together with information from the interviews, provides an interesting picture of the management structure surrounding the FBM program. A single office ran the program: the Special Projects Office (SPO). The purpose of SPO was to design, develop, and achieve initial and extended FBM operational capability. The SPO's achievements were truly remarkable: the Navy went from project approval to the first loaded submarine on station in four years. The FBM program concerned a very large complex weapon system: missile, submarine, navigation, fire control, and launching equipment. In addition, it also included the test ships, tenders, command/control/communications, team trainers, production facilities, and other support programs.

The FBM program got started not with initial considerations of hardware or production but rather with scientists and managers meeting in an initial four-month planning session. At that meeting, they figured out the technical goals and interfaces between subsystems and set forth a blueprint for the entire system. Although the project demanded major state-of-the-art breakthroughs, it was not started from scratch. A small, solid-fuel missile was already in development, the nuclear-powered attack submarine *Nautilus* was already deployed, and the problems of missile encapsulation and submarine stabilization were thought to be understood. The only outstanding problems apparently were navigation and communication. So the technological solutions to many problems were known and those that weren't were thought to be workable.

Organizationally, SPO reported directly to the Secretary of the Navy. This eliminated the need to seek approval for funds or programs through any intervening echelons. SPO was responsible for the total package. Their position was that a setback for any component would delay the entire program. SPO relied heavily on a management systems approach: they developed the PERT concept (Program Evaluation and Review Technique) and established an operations-style command center. Although Raburn describes the management organization and systems at length, he observes that it doesn't matter how efficient the organization is, or how powerful the computers are, or how sophisticated the PERT/cost systems and other techniques are. In his words, "...the men and women in your organization and in your industrial partners' organizations make or break your program" [14].

To summarize, the FBM program had a clear objective, a national mandate, ample funding, and manageable technical uncertainty. Then, with the proper focus and energy, it was made to work.

Management of ASW Programs

Turning next to ASW management, the establishment of a three-star Executive Director of ASW Programs in OPNAV (OP-095) and of a two-star Manager in the Naval Material Command (NAVMAT) (ASW Systems Project (PM-4)) constituted a landmark reference point. Many concerns voiced

during the late 1950s and early 1960s were identical to those heard today. Consider as examples:

> Until a single manager similar to that provided for the Polaris System...is established, it is doubtful that ASW will attain the goals so urgently required. [15]

> For a number of years, the Committee has relentlessly insisted that the Department of the Navy place greater emphasis on the field of anti-submarine warfare. The Committee has urged that the organization and management of the widely dispersed anti-submarine warfare programs of the Navy receive greater degree of coordination. [16]

The Congressional concern during this period led to an increase in funding by the Committee for ASW (a $255 million jump in 1960 alone) and also led to drastic changes in the organization of the ASW community within the Navy. In 1962, a committee headed by John H. Dillon, Administrative Assistant to the Secretary, conducted a comprehensive review of Navy management and found that there was a lack of centralized authority for the coordination and control of the Navy's complex ASW effort [17]. With Congressional urging, the Navy responded by establishing an ASW project administrator in NAVMAT in 1983. This was followed quickly by the creation of Director, ASW Programs (OP-095), in OPNAV in early 1964, and the formation of the ASW Systems Project Office (ASWSPO) (PM-4) in NAVMAT in mid-1964 [18].

The Director for ASW Programs had coordinating authority over ASW matters in all areas within OPNAV. He had the authority to state ASW requirements, establish plans and programs for ASW, and appraise progress. He also had tacit funding control through a strong charter and a direct-line relationship with ASWSPO. The Manager of ASWSPO was dual hatted as OP-951. For its part, the ASWSPO was responsible for technical direction and management control of ASW systems and components. It was to focus support where needed in order to expedite development and production. The ASWSPO also had management responsibility for coordination of effort and resources needed to sustain effective ASW capability in the fleet.

Two subsequent organizational events are also germaine. In 1974, ASWSPO's mission was trimmed to focus on studies and analyses for future capabilities, and it took on more of a planning orientation across platforms. Also, new initiatives concentrated on efforts to improve Fleet ASW readiness. It can be argued that these changes were the natural evolution of success in achieving the desired ASW improvements. In 1980, OP-095's charter was expanded to include all warfare areas, not just ASW. The Manager, ASWSPO, remained dual-hatted in OP-951, but clearly the focus of the three-star Director of Naval Warfare was diluted.

To summarize, OP-095 and the ASWSPO were established to coordinate and centralize managerial effort in making progress against the submarine threat. In contrast to the Polaris program, different platforms were involved, the required capability to be fielded was not as clear-cut, and there was less program unity. Although a dual-hatted arrangement was instituted between the buying commands (NAVMAT) and OPNAV, no special reporting arrangement existed with the Secretary of the Navy. It is not clear whether the collection of initiatives sponsored and managed by OP-095 and ASWSPO involved known technologies or whether significant technical uncertainty was involved (relative to the Polaris program).

Interviewee comments regarding the success of the OP-095/ASWSPO organizational structure were mixed. Many suggested that a similar structure was required today; some thought that the early effectiveness was due more to the presence of a strong individual who occupied the OP-095 slot; some volunteered that the structure had never been successful.

FINDINGS AND OPTIONS

This section presents findings that resulted from this analysis and provides additional comments and observations about those findings. Options for addressing deficiencies are explored and suggestions made for further studies. The findings, options, comments, and suggestions pertain to the situation that existed as of late summer 1989.

FINDINGS

The study found that:

> **Perceived organizational problems stem from fundamental disagreements concerning current force deficiencies, programmed forces, and research and development of technological possibilities.**

The interviews revealed that disagreements over force effectiveness and promise of new technological leads were the source of most complaints.

The study further found that:

> **Although the Platform Sponsors are powerful, they are by no means all-powerful. They are probably strongest in the early phases of the acquisition process.**

In the POM process, the Platform Sponsors' involvement is greatly curtailed after SPP submission. The DNCPPG is put together by OP-08 using, among other things, OP-07's Summary Warfare Appraisal. The Platform Sponsors' SPPs are reviewed by OP-07 and OP-08 jointly, changes are directed by OP-08, and the final Navy POM is decided on by OP-08/VCNO/CNO, who take it forward to Secretary of the Navy. There is no question that the OP-07/OP-08 team, the VCNO/CNO, and CNO/SECNAV are in position to shape the Navy program. A potentially fragile aspect of the process is the extent of OP-07's influence. OP-07's influence may depend as much on his personal qualities and his relationship with OP-08/VNCO/CNO as on the soundness of the arguments and reasoning in the appraisals.

Another worry is that, while the process looks balanced on paper, there could still be too much log rolling. Cross-mission, cross-warfare-area, and cross-platform tradeoffs are difficult, because often the evidence (scientific, engineering, analytical, and experiential) does not result in clear answers. This lack of clearly defined answers may cause Platform Sponsors to hedge bets and rely on "balanced" forces, which could lead to some log rolling. This is not to say that log rolling will be less likely if OPNAV were organized along warfare-area

lines. In fact, there is no reason to expect that any staff entity or deliberative body making choices across warfare areas would be immune from log rolling.

In the acquisition process, the Platform Sponsors promote most of the programs. They become the advocates for programs at the Defense Acquisition Board (DAB) and the Navy Program Decision Meeting (NPDM). Programs are subject to the operational requirements process that involves first OP-07, then higher approvals, prior to sending it forward. A platform-oriented organization may bias the new-start process against systems that don't fit nicely into established platform areas of concern. Sometimes new technological ideas that are worthwhile from a warfare-area or a mission point of view may not find ready sponsorship. There would also be a natural tendency on the part of Platform Sponsors to make platform follow-ons first among equals, perhaps at the expense of other nonplatform possibilities. Further, there are questions about the reality of OP-07's TOR/OR approval authority. Perhaps at the heart of this concern is skepticism about whether the OP-07 organization is staffed to do the job.

As to post-POM activity, Platform Sponsors have significant roles after the POM is sent to OSD and NAVCOMPT. The Platform Sponsors are a part of, sometimes the leaders of, the group preparing the OPNAV response for OSD's program review. In the NAVCOMPT and the OSD/OMB budget scrub, the Platform Sponsor's Program Coordinator attends the budget hearings with claimant representatives. The Platform Sponsors will then testify to Congress along with the claimants.

A potentially insidious route to Congress is information briefings provided to staffers by the program sponsors. Depending on how both the testimony and briefings are worded, issues previously thought to be closed could be reopened. Because OP-07 also provides informational briefings, Congress could hear many sides of an argument. However, one suspects that a fairly sophisticated audience would be required to sift through the information intelligently, especially given the ease of making a particular system in isolation appear indispensible. Given the pressures of responding to constituent interests, Congress may also seek a specific message or recommendation from the briefs.

On balance, the Platform Sponsors' structural power during the POM process is probably less than their power in the acquisition process and in post-POM activity. Even then, there are mechanisms in place that subject their power to the broader perspectives of OP-07, OP-08, and the VCNO/CNO.

The study further found that:

No functioning mechanism systematically aids the CNO in charting a long-term direction for the Navy.

Evidence from descriptions of how various boards, committees, and panels work; from interviews; and from strategic management theory all suggest that the Navy's strategic-planning process is not well formed. Theory suggests that large, complex organizations such as the Navy will indeed have strategic decision processes that are characterized by incomplete integration, parochial bargaining, means-ends confusion, and difficulty in achieving larger goals.

Existing mechanisms do not seem well suited to charting long-term directions. The PPB system cannot serve the strategic-planning function because it is very detail-oriented, has the short time horizon of Congressional fiscal decisions, and is so vast that it has a life of its own. Likewise, the acquisition process considers changes on a platform or system basis and may not consider the broader implications of individual decisions. Both processes clearly have some influence on the long-term shape of the Navy but do not present a broad direction. Likewise, the annual/biannual guidance documents, OSD's Defense Guidance and the Navy's DNCPPG, are too general to serve the purpose.

The CNO does have open channels to hear inputs on broad issues and technology, however (e.g., the CNO Executive Panel (CEP), the Navy 21 Study, CNA's Quo Vadis study), but, at present, the CNO must assimilate, synthesize, project, weigh, and decide largely on his own. Depending on the caliber of the CNO, those channels may be adequate for formulating a personal vision of the future, but the management literature suggests that they are not at all adequate for implementing that vision.

The team also found that:

> **In the earliest phase of the acquisition process, innovations that fall into the gaps between Platform Sponsors or that cross platform and warfare-area lines are at a disadvantage.**

Recent business research points out that several barriers to innovations can usually be found in large organizations like the Navy. The primary barriers are weak sponsorship of "inventions" that fit between or that cross over sponsor interests, the excessive rationalization and approvals required to get development started, and a weak reward/incentive system for idea generators and mid-level sponsors.

The first barrier, weak sponsorship of innovations that fall between platform areas, was a perceived problem voiced by many interviewees. In fact, regardless of which side of the reorganization controversy an interviewee was on, most agreed that there were both gaps and ineffective sponsorship and that overarching systems received inadequate sponsorship. The second barrier, problems with the innovation startup process, is a criticism that has been leveled at DOD acquisition for many years. Problems with reward systems (the third barrier) may also apply to the Navy insofar as Platform Sponsor power is used to "punish" those who propose alternative solutions to warfare problems,

although reward systems were not discussed heavily in the interviews. Many interviewees did voice the concern that many good ideas are being generated in Navy laboratories, but few are finding effective sponsorship. This suggests that the incentive/reward structure for mid-level sponsors may be deficient. Given the career patterns for line officers, there is little nurturing of the "fanatics," who are the likely source of innovation.

Finally, the team found that:

The Navy's process for growing broad-minded, nonparochial flag officers is not strong.

Many interviewees touched on the apparent inconsistency between the typical career progression to three-star rank in the Navy and the scope of the issues that the individual would be expected to wrestle with in many jobs at that level. The Navy grows platform specialists, for the most part, up through the rank of captain. Although they may get exposure to other platform communities, warfare areas, and strategic thinking, such exposure is not a goal of career development. A common thread running through the interviews was this concern with a mismatch between experience and the demands of high-level decision-making.

Community loyalty was perceived to be strong, contributing to high morale and esprit de corps but perhaps also leading to parochialism and a desire to "protect community interests." This observation holds not only at the aviator-submariner-surface officer level but often within platform communities as well (e.g., MPA/helo communities in aviation, cruiser types in surface warfare, and attack boat officers in submarines). The force of these perceptions is magnified by the very real power the Platform Sponsors have in making community assignments and perhaps in making promotions. The fear is that the career-enhancing jobs go to those who protect their communities. Regardless of the facts of the matter, if the perception leads to protection of community interests, then the Navy has a problem.

OPTIONS

The principal option under consideration for correction of any perceived deficiencies in OPNAV was a functional reorganization. As discussed earlier, because there is no objective measure of OPNAV's output, it is not possible to predict scientifically the effect of such a reorganization on OPNAV output and then use that output as the basis for developing pros and cons. Instead, the interviewees and the management/organization literature were tapped for insights into pros and cons. Such an assessment does not yield conclusive results. The analysis does suggest that a functional reorganization should not be contemplated for "light and transient" causes. It should be viewed as a drastic change with major ramifications. As such, it is reasonable to require that there be major output problems with OPNAV to warrant such turmoil; that is, the cure should fit the illness.

Three levels of severity of OPNAV output problems were postulated: severe, minor, and moderate. Three types of problems would perhaps be considered severe problems, warranting drastic reorganization: (1) inadequate warfighting effectiveness of programmed forces, (2) a technological revolution that would change the shape of the Navy and that could not be accomplished by current programmed R&D, or (3) threat prospects that are so urgent and community visions that are so parochial that a technological revolution would not be recognized.

OPNAV organization is a conceivable contributor to problems in the first two instances, but a more fundamental personnel problem underlies the last. The real question here is what the future shape of the Navy should be. If it will continue to be dominated by ships, submarines, and carrier-based tactical aircraft, the current organization has some considerable strengths. If, instead, the Navy should be making the transition to a force in which one or more of these platforms plays lesser roles and new "platforms" take on increasingly dominant roles (e.g., space-based systems, fixed systems, or cruise missiles), then the OPNAV organization may be an inhibiting factor. If individual parochialism will prevent such a technological revolution from even being recognized, then OPNAV reorganization would help orient people away from traditional solutions and toward the most effective, if unconventional, way to solve the warfare problems.

If one judges instead that OPNAV output problems are minor, or nonexistent, then the obvious option is to maintain the status quo. Even in this case, however, a few recommendations were presented, which, among other things, should help observers better understand how OPNAV functions.

Finally, for the sake of completeness, an option in between these two extremes was constructed to match some moderate, but unspecified, OPNAV output problems. This course seemed appropriate given the number of interviewees who thought that a drastic reorganization was not warranted but that aspects of OPNAV's output could be improved.

Functional Reorganization

If OPNAV were reorganized around warfare areas instead of platforms, it would look this: First, Platform Sponsors would be replaced with Warfare Sponsors: ASW, AAW, strike/ASUW/amphibious, strategic, and C^3/EW/space. Next, the manpower and training responsibilities (OP-29, OP-39, OP-59) would be moved to the DCNO for Manpower, Personnel and Training. Also, the maintenance/base responsibilities would be moved to DCNO for Logistics. Then the platforms would be assigned to Warfare Sponsors in as logical a fashion as possible; some would be arbitrary assignments. Finally, each community would be assured of at least one three-star admiral acting as a Warfare Sponsor so that the CNO has direct access to a three-star representative of each community.

The pros associated with functional reorganization are the following:

- It places primary emphasis on the entirety of a warfare area, which should be conducive to a holistic view of warfare.
- Reorganizations often stimulate fresh thinking, which eventually should reduce the tendency for the communities to view issues parochially.
- The act of reorganizing and the shape of the new organization send a strong signal to the officer corps regarding necessity for change: the new Navy need not look like the old Navy.
- The new organization should encourage more cross-community interaction in the same way that duty on a group or fleet staff breeds a deepened understanding of other platforms.
- To the extent that Platform Sponsor power has blocked effective handling of C^3, reducing platform power removes a barrier to C^3 development; this is especially true in the context of nurturing holistic warfare-area views and increased cross-community interaction.

Thus, it is clear that there are some very real advantages to organizing by warfare area, but most are germane to fundamental changes in the Navy versus evolutionary changes. The latter could probably be handled by making less drastic change to the basic organization.

The cons associated with functional reorganization are the following:

- If the strategic direction the Navy needs to move in is still undecided, then this may not be the optimal organization once the shape of the future Navy becomes clear; another reorganization may be needed.
- Allocating the Platform Sponsors' resources to the new Warfare Sponsors is a nontrivial and extremely important matter. It is more than a "detail" and it is likely to be the principal defining characteristic of the warfare areas. If too great a fraction of the funds has to be distributed in an arbitrary way, it will be difficult for the organization to work; the logic for assigning programs/resources must support the definition of coherent warfare areas.

- Officer career progression will have to be modified to develop credible warfare-area specialists to fill the Warfare-Area Sponsor jobs. On balance, strengthening warfare expertise will come at the expense of existing platform expertise.

- As to C^3/EW/space, the fundamental problems of developing reliable systems that will do the job in wartime remain. There is no guarantee that this reorganization will handle cross-warfare-area systems any better than the current organization.

- The reorganization does not solve the cross-platform tradeoff question but merely pushes it down one level in the organization. Cross-platform tradeoffs will still have to be accomplished within a warfare area, and those tradeoffs will remain difficult.

- Cross-warfare-area tradeoffs now become the focal point of the advocacy process and they are at least as difficult to fathom as cross-platform tradeoffs. There is every reason to believe that fair sharing and incrementalism will come to dominate resource allocation to the warfare areas as it has the Platform Sponsors.

- Reorganization ceases to be a tool for placing heightened emphasis on ASW (if that is the true underlying purpose of a reorganization) and could dilute the impact of ASW initiatives. If ASW were the only warfare area so organized, then it would have clearly been singled out for special consideration as might befit a number-one priority. If all warfare areas are treated the same, the reorganization ceases to underscore the special status of ASW.

- This particular reorganization has an added dimension of personnel turmoil because the Platform Sponsors are also the heads of the communities. There is no question that this will disturb morale within communities as well as introduce uncertainty regarding career development.

- Such a reorganization has the seeds to fragment accountability. At present, Platform Sponsors have a cradle-to-grave responsibility for their platforms and systems and the people who operate and maintain them. They sponsor the program start, oversee development and fleet introduction, manage logistics support and the community of people who man the platforms, and set Navy-wide policy. No longer will this collection of responsibilities reside in one individual; several individuals will share responsibility.

This is an imposing list of cons. Because the pros are most telling if there is to be fundamental change and because the cons are matters of substantial import, it seems advisable to consider such a reorganization only if there are severe problems with the current organization.

Status Quo

At the other end of the spectrum is an organization with only minor problems. Here the appropriate option would be to leave the basic organization as it is because output is generally fine. The recent POM-90 development process should be allowed to mature, but certain aspects of the acquisition and PPB process should be more widely publicized. These aspects include OP-07's honest broker role in relation to the Platform Sponsors, the cooperative agreement between OP-08 and OP-07 for sharing of review responsibility, and the absence of the Platform Sponsors at the final review/decision meetings. Perhaps OP-07's acquisition role as approver of TORs/ORs should also be strengthened, but this may need to be coupled with actions to assure that OP-07 is staffed to speak authoritatively on such issues. Also, it may be wise to broaden OP-07's role to include rationalizing force decisions to OSD and Congress. If feasible, OP-07 would then be providing useful continuity throughout all phases of the key decision processes. This would balance the continuity provided by Platform Sponsors with continuity provided by a cross-platform entity below the level of CNO and SECNAV. Again, the question of adequacy of OP-07's staffing arises, as well as the danger that post-POM rationalizing could evolve into an all-consuming role.

The underlying thrust of these modifications is to better publicize how decisions are actually made in OPNAV and the Secretariat. The true influence of OP-07 in developing programming guidance, in POM review, and in approving new starts should be publicized. Also the number of cross-cutting approvals required (1) before the POM leaves DON and (2) before new starts commence should be made known. The interviews highlighted the amount of misinformation outside observers pass on.

Strengthen Warfare View

Between the two extremes, a range of moderate output problems can be perceived that could require significant organizational or process changes but not functional reorganization. The most common problem voiced during the interviews was weak program integration across platforms and inadequate sponsorship for ideas falling into the gaps. Several tools could be used to correct these problems:

- Changing the organizational structure
- Changing the relative ranks of positions in the organization

- Improving promotion opportunities in certain organizational elements to attract stronger individuals
- Adjusting responsibilities in the key decision processes in ways that shift power
- Lengthening tours in some organization elements while shortening them in others.

Two options were constructd to strengthen OP-07 through personnel assignment.

Option A: Put the sponsorship of naval innovation in the hands of actors with cross-platform responsibilities. Give OP-07 "program sponsorship" responsibility for key RDT&E monies: all 6.2, 6.3 (Exploratory and Advanced Development), and perhaps some 6.4 and 6.6 (Engineering and Operational Systems Development) funds. The power to begin programs would thus be placed more firmly with OP-07, thus reducing the Platform Sponsors' scope for autonomy.

Option B: Give OP-07 programming authority for the so-called warfighting RAD, i.e., for the procurement/RDT&E part of the Navy program. This would effectively put OP-07 on a par with OP-08 and make the appraisals more forceful in the programming process. (A weaker version of option B would be to give OP-07 programmatic authority for only 6.2, 6.3, and some 6.4/6.6 monies.)

Both options of course have some cons. Option A runs the risk of shortening the time horizon within which RDT&E initiatives are considered. Although certainly charged with looking far into the future now, OP-07 is quite influenced by the PPBS time horizon. Giving OP-07 so much R&D responsibility could thwart whatever long-term perspective current R&D now reflects. But there is another side to this coin: giving OP-07 such a responsibility could lengthen his planning horizon. Obviously, uncertainty surrounds which result is likely to occur.

Option B has the seeds for built-in conflict between OP-08 and OP-07 and might result in no integrated POM being presented to the DPSB. Further, it is not clear at what level in the organization readiness and sustainability would be traded off against force structure and modernization. Some tradeoffs would occur within SPPs, but perhaps an additional mechanism would be required to make readiness and procurement tradeoffs at a higher level prior to the DPSB.

Acquisition and Innovation

The normative analysis suggests a need for a mechanism to handle ideas that might otherwise fall into the gaps between Platform Sponsors'

spheres of interest. Two things are needed: (1) a "sponsor" whose responsibility includes investigating and assessing all such ideas, and (2) the staff and funding adequate to permit a fair hearing of the ideas during the early acquisition process. Establishing a fourth ACNO (e.g., for Advanced Systems and Composite Warfare) would be one way of addressing this problem. This position would absorb the current OP-094 position as well as some programs and resources currently under Platform Sponsorship. This ACNO would become an additional potential sponsor for bright ideas, but would not be constrained by any attendant platform-vision limitations. If all four of the Sponsors would then decline to carry forward an idea, it would be reasonable to assume that that decision was not made because of limited platform vision.

Strategic Planning

Some consideration should be given to etablishing a mechanism for corporate long-range planning. The business literature suggests that for long-range planning to be successful, it must be carried out by the principals and not by an isolated planning group and that there must be some link to concrete decisions. To implement this, a board could be established composed of the CNO, VCNO, OP-08, OP-07, OP-06, OP-04, and perhaps OP-01, plus a technical expert. The board would be supported by a small staff. The National Security Council (NSC), as it existed at times under President Reagan, could be the model: strong, responsible principals (President, Vice President, Secretary of State, Secretary of Defense, and Director of Central Intelligence) supported by a staff for coordinating agendas and policy decisions (current NSC staff). The board would meet periodically, perhaps monthly, to discuss specific long-term choices facing the Navy. The board would be a vehicle for disseminating information, developing a common understanding of problems, and nurturing a consensus (from time to time) on where the Navy should be headed. Once every two years, the board's decisions would be recorded in the DNCPPG and fiscal guidance would be given to guide programmers. These latter actions would constitute the concrete link essential to successful planning.

A technical expert should be included on the board, because periodic briefings by outside experts probably would not provide the necessary knowledge about current research and its potential applications to naval warfare.

Personnel

Based on some of the interviews, one of the most pressing problems facing the Navy is how to develop top leadership. The challenge is to find a way to produce flag officers with a broadened perspective. This problem is an extremely difficult and emotional one. Because of the kinds of career progression apparently required for major command, there are no easy solutions. As to perceived parochialism at the three-star level, OPNAV could be organized so that all three-star jobs would have responsibilities that cut across all platform areas. This might signal

that three-star rank brings with it responsibility for the entire Navy and should be above community parochialisms. Perhaps all admirals could even remove their community insignias as a visible sign that achieving flag rank is a departure from one's community. All of these measures would no doubt be quite controversial and might even have only limited effectiveness. Perhaps establishing an outside Blue Ribbon Task Force of retired admirals to consider the problem is the best way to proceed. It would at least signal recognition of the problem.

ADDITIONAL STUDY

At least two areas of this analysis require further study. The impact of technological progress on the future Navy was an important part of the research effort, but much more information is needed. Additional study by technical experts is required to determine if we are indeed on the brink of a technological revolution that will change the fundamental shape of the Navy. Such an investigation must consider all Navy special-access programs that are under way. The objectivity of the investigators of such a study must be beyond question.

Additional study is needed also on personnel matters, particularly if the functional reorganization becomes a reality. Organizational changes that reduce or remove the Platform Sponsors' power need to be carefully examined from the personnel point of view. Strong platform communities are a source of the Navy's success--they act as strong unions to knit people together, help them belong, and enable them to work as a team. Disturbing the Platform Sponsor system is not something to undertake lightly; acts that put the existence of communities in jeopardy are serious. An implementation scheme that would retain the current strengths and minimize turmoil should be sought.

GLOSSARY

AAW	antiair warfare
ACMC	Assistant Commandant, Marine Corps
ACNO	Assistant Chief of Naval Operations
APN	Aircraft Procurement, Navy
ASN	Assistant Secretary of the Navy
ASN(RES)	Assistant Secretary of the Navy for Research, Engineering and Systems
ASW	antisubmarine warfare
ASWSPO	ASW Special Projects Office
ASUW	antisurface warfare
C^3	command, control, and communications
C^3I	command, control, communications, and intelligence
CEO	chief executive officer
CEP	CNO Executive Panel
CMC	Commandant, Marine Corps
CNA	Center for Naval Analyses
CNO	Chief of Naval Operations
DAB	Defense Acquisition Board
DCI	Director of Central Intelligence
DCNO	Deputy Chief of Naval Operations
DG	Defense Guidance
DNCPPG	Department of the Navy Consolidated Planning and Programming Guidance
DOD	Department of Defense
DON	Department of the Navy

DOP	Development Option Paper
DPSB	Department of the Navy Program Strategy Board
EW	electronic warfare
FBM	Fleet ballistic missile
FYDP	Five Year Defense Plan
LRAACA	Long Range Air Antisubmarine Warfare Capable Aircraft
MNS	Military Needs Statement
MPN	Military Personnel, Navy
MPT	Manpower, Personnel, Training
NAVAIR	Naval Air Systems Command
NAVCOMPT	Navy Comptroller
NAVMAT	Naval Material Command
NAVSEA	Naval Sea Systems Command
NCB	Navy Comptroller, Director of Budget and Reports
NFIP	National Foreign Intelligence Program
NPDM	Navy Program Decision Memorandum
NSC	National Security Council
OMB	Office of Management and Budget
O&MN	Operations and Maintenance, Navy
ONR	Office of Naval Research
OPN	Other Procurement, Navy
OPNAV	Office of Chief of Naval Operations
OR	operational requirement
OSD	Office of the Secretary of Defense
PBD	Program Budget Decision
PDM	Program Decision Memorandum

PDRC	Program Development Review Committee
PERT	Program Evaluation and Review Technique
PM	Program Manager
POM	Program Objectives Memorandum
PPBS	Planning, Programming, and Budgeting System
PRC	Program Review Committee
RAD	Resource Allocation Display
R&D	research and development
RDT&E,N	Research, Development, Test, and Evaluation, Navy
SAE	Service Acquisition Executive
SAP	Special Access Program
SCN	Shipbuilding and Conversion, Navy
SECNAV	Secretary of the Navy
SPP	Sponsor Program Proposal
SPAWAR	Space and Naval Warfare Systems Command
SPO	Special Projects Office
SPRG	Special Projects Review Group
SSPO	Strategic Systems Project Office
SYSCOMs	Systems Commands
TOR	tentative operational requirement
VCNO	Vice Chief of Naval Operations
WPN	Weapons Procurement, Navy

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APPENDIX A

INTERVIEWEES

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APPENDIX A

INTERVIEWEES

SYSCOMS	RAdm. Brooks	SPAWAR-30
	Adm. Busey (ret.)	ex-NAVAIR
	RAdm. Carlson	NAVSEA, pros-ASW Tech Pm
	VAdm. G. Clark (ret.)	ex-SPAWAR
	J. Colvard	ex-NAVMAT/Lab
	Adm. DeMars	NAVSEA NUC PWR
	RAdm. Dorman (ret.)	ex-PD-80
	Capt. Fontana	PMW 145
	VAdm. Rowden (ret.)	ex-NAVSEA
	RAdm. Topping	SPAWAR-32
	Dr. Tunstall	Dir. Navy Labs
	RAdm. Weaver	SPAWAR
Platform Sponsors	VAdm. Cooper	OP-02
	Adm. DeMars	ex-OP-02
	VAdm. Doyle (ret.)	ex-OP-03
	VAdm. Dunn	OP-05
	Capt. Foote	OP-30
	Ms. Hughes	OP-05C
	Cdr. Larmee	OP-02M
	VAdm. Martin	ex-OP-05
	VAdm. Metcalf (ret.)	ex-OP-03
	VAdm. Nyquist	OP-03
	B. Powers	OP-50W
	VAdm. Rowden (ret.)	ex-OP-03
	RAdm. Taylor	OP-50
OP-07/OP-08	Adm. Baggett (ret.)	ex-OP-095
	I. Blickstein	OP-80D
	RAdm.(Sel). Briggs	OP-70B
	RAdm. Fitzgerald	OP-71
	Adm. Hogg	ex-OP-07
	Adm. Jeremiah	ex-OP-090
	RAdm. Kalleres	OP-80
	Capt. Killinger	OP-75
	RAdm. Loftus	OP-82
	Adm. McKee (ret.)	ex-OP-095
	VAdm. Miller	OP-07
	C. Nemfakos	OP-82B
	RAdm. Oliver	ex-OP-70
	R. Passarelli	CNA RPD (Systems Test.)
	RAdm. Pittenger	ex-OP-71
	Adm. Small (ret.)	ex-OP-090
	VAdm. Smith	OP-08
	M. Smith	CNA RPD (Warfare Cap.)

R&D	VAdm. Baciocco (ret.)	ex-OP-098
	A. Berman	ex-NRL
	J. Colvard	APL/ex-Lab/NAVMAT
	VAdm. McCarthy	OP-098
	RAdm. Miller	Acting OP-098B/ex-OP-981
	R. Passarelli	CNA RPD (Systems Test.)
	P. Selwyn	Dir., ONT
	F. Shoup	OP-987
	Dr. Tunstall	Dir., Navy Labs
Secy/CNO/VCNO	P. Beach	SECNAV Sp. Asst.
	Adm. Edney	VCNO
	Capt. Emery	EA UNDERSECNAV
	Adm. Hardisty	ex-VCNO
	Adm. Holloway (ret.)	ex-CNO
	Adm. Long (ret.)	ex-VCNO
	Capt. McDevitt	Dir., CEP
	B. Murray	ex-UNSECNAV
	RAdm. Paulson	EA, CNO
	Adm. Small (ret.)	ex-VCNO
	Adm Trost	CNO
Other Navy	VAdm. Boorda	OP-01
	RAdm. Cargill	OP-094B
	Adm. Edney	ex-OP-01
	Adm. Foley (ret.)	ex-CINC/OP-06
	Adm. Larsen	OP-00K
	J. Nakhleh	CNA-VP: NWO Div.
	D. Rosenberg	NAVWAR COL
	B. Turcotte	NAVWAR COL
	RAdm. Wolkensdorfer	Dir., ASW Adv. Tech.
Non-Navy	J. Borsting	ex-OSD Comptroller
	F. Byrom	CNA Board/ex-CEO Koppers Corp.
	T. Christie	OSD-Acquisition
	D. Chu	ASD (PA&E)
	R. Elford	HAC Prof. Staff (R&D)
	N. Mosher	SASC Prof. Staff
	R. Murray	HASC Prof. Staff/ex-PA&E
	A. Pennington	OSD PA&E (Naval Forces)
	L. Reggelson	ex-NWC China Lake

APPENDIX B

SUMMARY OF CLASSICAL AND BEHAVIORAL ORGANIZATION THEORY

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APPENDIX B

SUMMARY OF CLASSICAL AND BEHAVIORAL ORGANIZATION THEORY

INTRODUCTION

This appendix reviews the principal results gleaned from the literature on the following three areas of organizational structure and management: (1) designing an effective and efficient organizational structure, (2) designing an innovative organizational structure, and (3) determining the role of management within these two organizational structures.

The design of efficient organizations has traditionally received great attention because the most immediate problem facing practitioners is how to maintain an organization's decision-making ability in the face of increasing complexity. In contrast, the design of innovative organizations has only recently received attention because innovation has been viewed in the past as being only loosely related to organizational structure. Moreover, because an innovative structure has been viewed as being incompatible with the goal of efficiency, few theorists have believed it is possible to design a structure that is both efficient and innovative. Given the choice between an efficient structure and an innovative structure, most organizations have pursued the former. Recent research suggests that an effective balance can be struck between these two goals through effective management.

In its earliest form, the design of organizations was studied exclusively by practitioners, and thus there was little difference between organizational design in theory and in practice. As one might expect, these early (classical) theorists expressed a strong interest in hierarchy, "practical relevance, and operationality" [B-1]. The design issue was: How many managerial roles are needed for a given work force? The answer to this question is determined by choices of span of control (i.e., how many employees are to be placed under a manager) and the number of staff experts employed" [B-1]. Although classical theory was mechanistic and slighted the role of the individual, these early theorists developed and used several organizational concepts including division of labor, departmentalization, and early use of a line-staff structure.

Ultimately, the gaps left by the mechanistic focus of classical theory would give rise to the so-called human-relations school around 1940. Unlike the founders of classical theory, most supporters of the human-relations approach were not practitioners but academicians concerned with the "large-scale waste of human resources" [B-2] brought about by an organization's lack of employee orientation. They argued that management must give workers greater involvement in the decision-making process and foster more trust for management among individuals [B-2]. The human-relations theorists can be credited with improving

organizational efficiency through reward systems, worker involvement, and early efforts to integrate knowledge and ability across distinct groups or tasks.

Because the organizational theories of the classical school can be attributed to managers in operating organizations, these theories were adopted by organizations much more readily than the theories of the human-relations school. Thus, until the late 1950s, most organizations considered restructuring strictly within the context of the classical theory. In his classic 1962 book, *Strategy and Structure*, Chandler [B-3] looks at the development of four major American corporations (DuPont, General Motors, Standard Oil, and Sears & Roebuck) and identifies the problems and solutions that led to the creation of the modern, multidivisional structure. Initially, the demand for reorganization grew simply from an expansion in manufacturing and sales that led to an increase in the complexity of managerial decision-making. The response by practitioners was to emulate the experiences of the railroad and to reorganize their loosely structured holding companies on the basis of centralized, functionally divided departments. In many instances, this reorganization was satisfactory, but for those companies affected by new markets or new technologies, a continued redevelopment of organizational design became necessary.

At DuPont, for instance, the rapidly expanding and highly competitive chemical market placed pressure on the organization to operate as efficiently as possible in an environment of increasingly complex decision-making. DuPont responded by adopting an aggressive strategy of diversification to capitalize on this market growth and maximize its resources. This decision placed great strain on the existing functional departments (particularly manufacturing) because it forced decision-making up the managerial hierarchy to executives with the necessary understanding of market complexities. Upper management became overburdened with day-to-day decision-making and could no longer effectively perform its primary function of devising long-term strategy. As a result, "the strategy of diversification quickly demanded a refashioning of the company's administrative structure if its resources, old and new, were to be used efficiently and therefore profitably; for diversification greatly intensified the administrative load carried by the functional departments and central office" [B-3].

DuPont's subsequent reorganization was twofold. First, it created a new layer of management responsible for a single product line (division) and placed separate functional departments under each division. This new multidivisional structure proved to be far more effective because it moved operational decision-making out of the central office, placing it in the hands of the division managers. This allowed top management to once again concentrate on its strategic role. The second change made by DuPont was to introduce an executive staff responsible for providing division (line) managers with the information necessary to make effective decisions. This new line-staff structure was a major breakthrough in organization design and will be discussed later.

By the 1950s, the amount of empirical analysis being produced had become so vast, so diverse, and so specialized that it no longer made sense to speak of the study of organizations in terms of schools. Moreover, the primary contributors to the study of organizational structures ceased to be management executives and became academicians who emphasized the need to improve efficiency within the general framework of the multidivisional organization and the line-staff structure. Much of the research in organizational design thus became an attempt to synthesize the obvious improvements of the classical school with the contributions and concerns of the human-relations school.

DESIGNING FOR EFFICIENCY

Although the solutions to the problem of efficiency continue to become more effective and more complex, they remain spurred on by what Galbraith identifies as a single factor--uncertainty [B-1]. Uncertainty, in Galbraith's framework, is "the difference between the amount of information required to perform the task and the amount of information already possessed by the organization." Where uncertainty exists, decisions that are both timely and effective cannot be made. Thus, uncertainty directly impinges on performance level. Because all organizations function with finite resources to collect information and to complete given tasks, the ability to use these resources efficiently is critical to eliminating uncertainty while maintaining performance. Efficiency, therefore, can be viewed as the optimization of information and information resources in order to complete a given task at the performance level desired by the organization.

As an example of this construct, Galbraith discusses the operation of Chandler's, a large, multilevel restaurant with an extensive menu [7]. Efficient operation of the restaurant depends greatly on effective coordination between the cooks, the people working the pantry, and the "runners" who supply the pantry with salads, breads, eggs, and other perishables. Ideally, the runners should stock the pantry with precisely the amount of supplies needed. This goal proves very difficult to achieve, however, because demand fluctuations throughout the evening create uncertainty in the supply system. Under its present structure, the restaurant faces a difficult situation: Either the runners oversupply the pantry, which leads to waste and spoilage, or they undersupply the pantry, which leads to time delays and poor service. As a result, uncertainty impinges directly on the restaurant's performance level.

Although the example of Chandler's restaurant is analogous to any organization operating with demand uncertainty, there are many other forms of uncertainty that can affect the performance of an organization. As a second example, one could apply Galbraith's theory to the problems at DuPont discussed previously. In this case, the new strategy of diversification created an increase in decision-making complexity. This created uncertainty for middle managers because they no longer had the

information necessary to ensure proper decision-making. To overcome this uncertainty, middle managers required more resources (time) for each decision. This led to an overload in the management hierarchy that forced decision-making up to the top level of management. The uncertainty created by DuPont's new strategy thus impinged on the company's performance level because top management's time was being wasted by day-to-day decisions.

If Chandler's restaurant remains profitable, management may never make an effort to improve its operation. In fact, the extra spoilage that would result from oversupplying the pantry could simply be passed to the customer by an increase in cost. However, if Chandler's profit margin is thin or if it is operating in a highly competitive environment, the inefficiency of the current structure would be unacceptable to management, and a restructuring would be likely to take place.

The five forms of restructuring that Galbraith introduces vary greatly, but with the exception of the first--the creation of slack resources--they are all based on eliminating uncertainty at the lowest possible level of the management hierarchy. Also, it is important to note that Galbraith intends for these alternatives to be an exhaustive list. "The organization can choose to follow one [design strategy] or some combination of several if it chooses....However, what may be lost in all of the explanations is that the five strategies are meant to be an exhaustive set of alternatives" [B-1, p. 55]. The first three alternatives, (1) the creation of slack resources, (2) the creation of self-contained tasks, and (3) environmental management, are efforts to reduce the amount of information an organization must process [B-1]. The first of these, the creation of slack resources, is not so much a design alternative as a basic axiom of organization design. Through the creation of slack resources, a company seeks to overcome uncertainty simply by accepting a reduced performance level. For instance, if the management at Chandler's restaurant had allowed the runners to overstock the pantry, reducing profitability, it would be creating "slack" in its operation. Likewise, a company may allow more time to manufacture its product, thus creating "slack" in its production schedule and reducing the overload on hierarchical channels [B-1].

For an organization strongly motivated by concerns of efficiency, the shortcomings of creating slack resources are both obvious and acute. By creating (or allowing) slack resources, an organization essentially builds inefficiency into its structure. For this reason, the creation of slack resources is oftentimes simply a default design alternative; that is, if an organization is faced with uncertainty and chooses to do nothing, the design alternative it has adopted is slack resources.

The creation of self-contained tasks is precisely the design alternative DuPont adopted when it moved to a multidivisional structure. Unlike the creation of slack resources, the creation of self-contained tasks is an attempt to resolve the issue of uncertainty while maintaining performance. Creating self-contained tasks is based on a shift in

an organization's authority structure from an input (skill, occupation, resource) basis to an output (product, geographic location) basis. The result is a large increase in the number of questions that can be answered at low levels of the management hierarchy and the elimination of questions concerning output priority [B-1].

The potential costs associated with self-contained tasks are the loss of skill specialization and also of economies of scale [B-1]. In a multidivisional structure, for example, the duplication of functional departments creates a duplication in the need for both equipment and specialized personnel. This means that an employee with a specialized skill (like an electrical engineer) must either become a generalist capable of performing other specialized tasks or he must be duplicated within each department, thus creating "slack." As a result, the decision to organize around subtasks becomes a question of whether these costs exist, and if they do, whether they are outweighed by the benefits discussed earlier.

The final effort at information reduction, environmental management, eliminates uncertainty by modifying the environment in which the organization functions. Returning to the example of Chandler's restaurant, if the management had attempted to eliminate demand uncertainty by reducing the size of the menu or by offering a buffet, it would be following a program of environmental management. Although this alternative can be very effective, it is more of a strategic decision than a form of restructuring.

In contrast to reducing the need for information, the final two design alternatives focus on increasing the capacity of the organization to collect or use information. The first of these alternatives for collecting information is "investment in vertical information systems." At a level in the organization at which the number or complexity of decisions has increased, an organization may wish to expand its resources for gathering information or for performing tasks. The first way this could be done would be to invest in the organization's manpower, either by better using present personnel or by bringing in additional personnel. DuPont followed this alternative when it expanded and moved to a line-staff structure.

The second way an organization could increase its capacity to collect or use information would be to invest in technology. Today, investing in technology is clearly the most popular form of restructuring because the cost to the organization is simply the price of the technology [B-1]. Moreover, investment in technology is easy because an organization can generally avoid a major structural change. This is not to say that investment in technology does not have its limitations. As Galbraith notes, "computers have been limited in their use in less structured problems at middle and top levels of management" [B-1]. For these areas, investment in manpower or in a combination of man-machine usage appears to be irreplaceable.

The final design alternative is the use of lateral relations. Lateral relations is a broad term used by Galbraith to refer to any formal or informal structure that cuts the decision-making process across lines of authority. The goal of this design is to "move the level of decision making down to where the information exists rather than bringing the information up to the point of decision" [B-1]. This approach has received primary focus over the last 20 years because it attempts to resolve the conflict between organizing around self-contained tasks and the need to integrate across subtasks; thus, it can be seen as an effort to bring together the concerns of both classical and human-relations theorists.

Lawrence and Lorsch [B-2] introduced the concept of lateral relations in 1967. They analyze the organizational requirements of companies operating in three industries--containers, food, and plastics--with very different levels of information uncertainty. At one end, companies in the container industry operated in a stable environment with little uncertainty. They focused their resources on maintaining quality while keeping down costs. In their research, Lawrence and Lorsch found the most successful organizations in this industry simply followed a classical structure and focused on a strict managerial hierarchy to make decisions. At the other end, companies in the plastics industry operated in a highly unstable environment characterized by strong competition and technological innovation. The level of uncertainty in this environment was very high because decision-making was both critical and complex. Therefore, although the use of a line-staff structure was highly beneficial, the simple application of classical design (including grouping by subtasks) proved inadequate because the decision-making hierarchy still became overloaded. The answer, Lawrence and Lorsch found, was to formally incorporate lateral relations into the design.

The "integration" of information resources described by the term lateral relations exists to some degree in every organization. The important point is to match the level of integration to the level of uncertainty. Thus, at the lowest level, organizations faced with little uncertainty should pursue integration informally, "primarily through the managerial hierarchy" [B-2]. This is precisely the path taken by the most efficient, successful organizations in the container industry. For organizations faced with some uncertainty, integration should be pursued more formally, through the use of individual "integrators." In the food industry, for example, Lawrence and Lorsch found that the most effective organizations had assigned integrating roles to managers within the various functional departments [B-2]. These managers were responsible for gathering important information not only through the managerial hierarchy but also through meetings with colleagues and even through the formation of "teams" of specialists. They were then expected to provide the information to the appropriate individuals in their department or subunit.

In environments characterized by high levels of uncertainty, effective organizations must employ highly formalized structures to achieve

the needed level of integration. In the plastics industry, effective organizations achieved the desired level of integration through the creation of an entire "integrating" department. In addition to performing a role equivalent to the integrators in the food industry, individuals in this department served as organizers for "an elaborate set of permanent integrating teams" [B-2]. These teams were responsible for sharing important information between departments and also for settling interdepartmental disputes.

Where the complexity of decision-making is at its highest, many researchers since Lawrence and Lorsch have argued that using an integrating department is still an inadequate structure for meeting the needed level of integration. Galbraith, for example, discusses the replacement of the classic hierarchical design structure with the matrix structure. The basis of the matrix structure is the "establishment of a dual reporting relationship" whereby linking managers report to both a resource department as well as a product or program office [B-1]. Thus, a formal balance of power is established between the project and resource departments with the linking manager playing the role of the integrator. "Each circumstance, which cannot be predicted in advance, needs to be resolved on its own merits. Rather than refer each circumstance to a general manager, the matrix design institutionalizes an adversary system. The resultant goal conflict causes search behavior to discover current information and to create alternatives to resolve the conflict" [B-1].

To sum up the organizational efficiency results, the key point is to have the organizational structure meet the needs of the entity. An entity must first consider the environment in which it operates--its stability, complexity, level of competition. Then, it can adopt a structure that will optimize its information and information resources to operate at a desired performance level.

DESIGNING FOR INNOVATION

Traditionally, designing for innovation has received little consideration because of a skepticism that innovation and design are closely related and a concern that designing for innovation would lead to a loss of efficiency. Although recent research has shown a link between successful innovation and organizational structure, it has also held up the belief that innovative structures are less efficient than noninnovative structures. For an organization in need of an innovative structure, the question becomes what balance should be struck between innovation and efficiency in the organizational design. The answer to this question is based upon the goals of the organization as dictated by the environment in which it operates. Any commitment of resources to innovation means a reduction in resources for task completion and a subsequent loss of efficiency. This means designing for innovation requires slack resources. The extent to which an organization chooses to pursue an innovative design depends, therefore, on both its desire and its ability to create a structure that allows for slack resources.

Unlike efficiency, innovation may be of limited value to many organizations. On the one hand, an organization that operates in a stable environment characterized by low uncertainty (like the container industry) is appropriately most concerned with product quality and delivery schedules. It will want to concentrate on efficiency and not waste undue resources in pursuit of innovation. On the other hand, an organization that operates in an unstable environment characterized by high uncertainty (like the plastics industry) is likely to view technological innovation as a crucial element in its ability to compete; although it will want to maintain efficiency, it must allocate resources in pursuit of innovation. Thus, while a container company would strongly emphasize efficiency in its design, a plastics company would also want to include slack resources for innovation.

Before examining the factors affecting innovation in a given organization, a distinction must be made between innovation in small versus large organizations. Generally, it is assumed that small organizations are more capable of being innovative than large ones [B-4]. Although Quinn agrees with this assessment, he also believes that the low profile of small organizations has overstated this "innovation gap"; that is, small organizations appear to be such highly successful innovators because they receive tremendous recognition if their ventures succeed but receive little attention if they fail. Moreover, due to their sheer numbers, small organizations are ensured of a large number of successful ventures even if the vast majority fail.

Quinn goes on to identify several advantages small companies possess in pursuing innovation [B-4]. Ironically, the first three of these advantages can be attributed to a lack of resources on the part of small firms. The first is a "need orientation" (as opposed to a market orientation) that brings the entrepreneur into close contact with potential customers at an early enough stage to test their ideas in the user's hands. This allows small firms to make design changes rapidly according to the specifications of the customer. Second, because small firms are likely to have cheap rent and equipment, they are able to invest almost all of their resources directly into their projects. This low overhead also contributes to a third advantage--the small firm can draw the capital it needs from a variety of sources committed to financing "small, low probability ventures" [B-4].

The small company also has several advantages attributable to its structure and environment. First of all, because small companies do not have to concern themselves with bureaucratic delays and board approvals, they can adapt quickly to changing conditions. This gives small companies a sizable advantage over larger organizations in terms of both timing and performance. Second, leaders of small organizations can easily foresee the potential fruits of their labors, and this personal orientation further fuels a "fanaticism" found in most entrepreneurs. Third, the "fanatic" is likely to ignore or underestimate obstacles and time constraints, giving the small company a long-term perspective not

found in most large organizations. Lastly, unencumbered by formal plans or market strategy (and equipped with great flexibility), the small company can approach problems with far greater variety than a larger competitor. This "multiple approach" style allows a small company to pursue low probability approaches that a larger company would ordinarily abandon. Further, through multiple approaches, a small company is more likely to make an accidental or unexpected discovery.

Quinn also criticizes large organizations for a number of general factors that inhibit innovation [B-4]. The first factor is "top management isolation" that causes executives to lose touch with customers and workers who could contribute strongly to the innovation process. The second factor is a common intolerance of "fanatics" who do not appear to fit into the "company mold" but who also tend to be the leading entrepreneurs in an organization. The third factor is the obsession by many organizations to show short-term profits, results, etc., while sacrificing long-term effectiveness through innovation. Fourth, the large startup costs and overhead associated with any project places pressure on a large organization to show immediate success. The tendency then is to avoid areas of research, like innovation, that may be seen as useless liabilities. Fifth, the presence of an (excessive) bureaucracy may waste time and increase costs. As Quinn points out, "Experiments which a small company could perform in hours may take days or weeks in large organizations" [B-4].

By applying the advantages of the small organization to the operation of a large organization, Quinn introduces several ways large organizations can facilitate innovation. Although most of these are simply the antithesis of the factors mentioned above (vision and understanding of top management, support for fanatics, long-term perspective by the organization, minimal bureaucracy), two others, which require the commitment of slack resources, are worth mentioning. The first of these is the use of "skunkworks," or small teams of engineers, designers, etc., who function with no interference from the rest of the organization. As a result, an innovative team can be established with all the benefits associated with a small organization (fast communication, no bureaucracy) and all the resources available to a larger organization. The second way an organization can facilitate innovation is through the use of competition at the development level between teams. If conducted well, this method can provide a large organization with innovative ideas that mimic the "multiple approach" style of a small firm.

Quinn combines these "facilitators" to innovation and introduces an approach to innovation that uses "phased program planning" as opposed to highly structured planning traditionally associated with large organizations [B-4]. Under this approach, top management optimizes personal initiative and entrepreneurial skill through the outline of broad, challenging goals for new programs. Typically, ideas to meet these goals are initiated by staff members, but they can begin anywhere within the organization. As these ideas develop and options crystallize, management begins to define the most important technical sequences and

decision points. Competition is an important factor in innovation, and an organization pursuing innovation should support parallel development between competing approaches. Decisions concerning when and how targets are to be met should be left open for as long as possible. Given the amount of uncertainty, at no point during this development are managers to be left with only one option. Instead, they should maintain secondary approaches with which to hedge their bets.

The obvious cost to "phased program planning" is a considerable loss of efficiency. The use of competition during the design and development phases would be particularly costly because it would entail a large pool of slack resources from which to draw. Whether an organization decides to pursue this approach or one that requires less (or even more) slack depends on its innovation needs as dictated by its environment.

In the most unstable and complex environments, the usage of slack resources in any amount may prove inadequate to meet an organization's innovation needs. In these cases, the best way for an organization to remain competitive may be to create a formal structure committed to innovation. The creation of such a structure has come under consideration only recently and is clearly the most severe effort at designing for innovation.

Galbraith introduces a design that employs an "innovating structure" that functions within the regular operating organization [B-5]. It is composed of three roles--idea generators, sponsors, and orchestrators (see figure B-1). The idea generators are the "fanatics" of the organization who champion a given innovation and are responsible for its success or failure. The sponsors are the promoters of an idea, and they are crucial to carrying an innovation through to implementation. Their importance is underscored by the fact that idea generators are oftentimes low-level employees with little ability to follow through on their idea [B-5]. Because several ideas may be promoted at one time, the sponsor should have a good understanding of both the technical and business sides of an idea. He is therefore often a middle manager who works for both the innovating organization and the operating organization in which it functions. The orchestrators are the members of upper management responsible for championing a given idea at the executive level. "An orchestrator is necessary because new ideas are never neutral. Innovative ideas are destructive; they destroy investments in capital, equipment and people's careers" [B-5].

The key to the effectiveness of Galbraith's innovating organization is "differentiation." Differentiation refers to the formal separation and insulation of the innovation process from the operating organization. It is based on the use of "reservations" or organizational units devoted entirely to the creation of new ideas. These reservations are very similar to Quinn's "skunkworks" but are located at every level of an organization. This way, no matter where an idea is generated, it will receive attention within a reservation. "Outside reservations,"

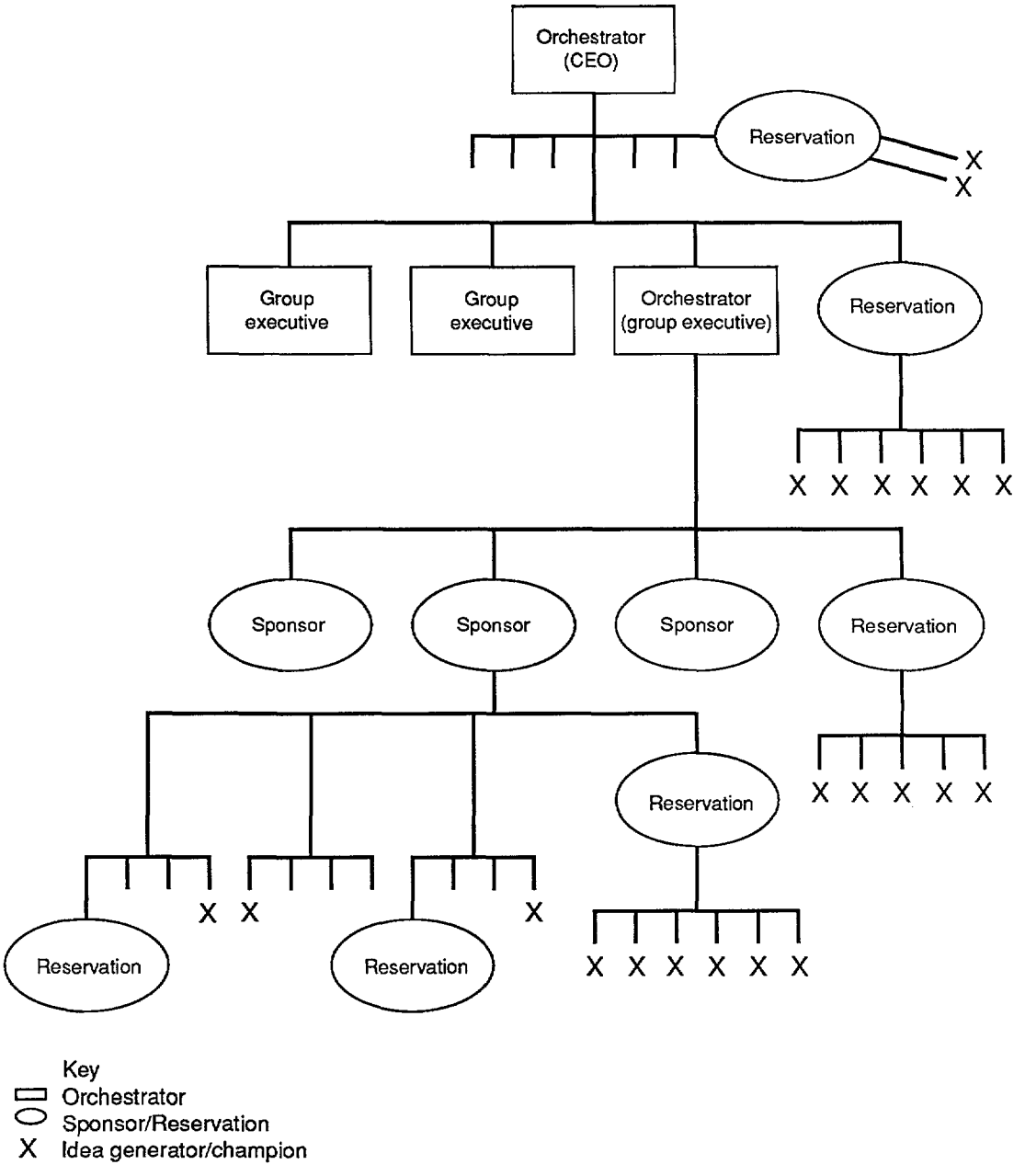

Figure B-1. "Innovating structure" within an organization

like universities or consulting firms, can also be used to tap idea generators outside of the operating organization.

With the exception of firms operating in the most stable environments, the ability to innovate (or at least to allow for innovation) may be vital to an organization's long-term success. The level of commitment to innovation typically depends on the ability and willingness of an organization to produce slack resources. The greater the slack, the greater the commitment to innovation. Ultimately, the design strategy an organization pursues should be the most effective balance between an efficient design and an innovative design. It is management's responsibility to find this balance and to use the resulting design in the most effective way.

THE ROLE OF MANAGEMENT

The overall success of an organization depends to the greatest extent on the ability of management to find solutions to both the short- and long-term problems it faces. Because short-term problems involve different considerations than do long-term problems, this statement implies that a distinction exists (or should exist) within management between short-term and long-term problem-solvers. On the one hand, short-term problem-solvers are middle and lower managers whose concerns are primarily operational. The question they continually seek to answer is: What is the best way to use my resources within this structure and fulfill strategic requirements? On the other hand, long-term problem solvers are upper or "top" managers whose primary concerns are strategic. They are responsible for outlining broad operational goals and matching an organization's structure with these goals. This distinction in the responsibilities of lower and upper management indicates that a distinction must also be made within management structures.

Middle and lower management have little responsibility for determining the structure of an organization. They work within the structure set down for them by top management. Middle and lower management are expected to maintain the efficiency of an organization and thus keep day-to-day decision-making out of the "hair" of top management. At the same time, they are expected to support innovation. In complex organizations characterized by strong competition and high uncertainty, there is a strong tendency for problems to move up the hierarchy to upper managers with a stronger authority and better strategic understanding to make decisions [B-3]. There is also a vital need for innovation. As a result, in highly complex organizations, the ability of lower and middle management to both maintain efficiency and support innovation is most difficult.

The most common method by which lower level managers successfully perform these dual responsibilities is through the effective use of the line-staff structure. The effectiveness of the line-staff structure is due to the clarity of its chain of command, which allows authority and responsibility to be easily delegated to middle and lower (line)

management. These managers are better equipped with understanding of problems close to them, and if given the necessary authority, they also have a stronger commitment to solutions to problems within their unit [B-3]. The executive staff has no decision-making authority. Because it generally operates out of the central office, the staff has allegiance to no single unit and can thus provide information and advice to managers that is specialized, unbiased, and intended for the overall good of the organization. In addition, the executive staff is able to provide line managers with a global or strategic perspective to problems that they may otherwise lack.

With regard to innovation, the effectiveness of the line-staff structure is again the result of a clear chain of command. Because lower level managers are responsible for solving operational problems, they are in an excellent position to be idea generators for innovations. This is particularly true of middle (line) managers who may have access to information at all levels of the managerial hierarchy and who are in an excellent position (in terms of political support, people, money) to follow through on their ideas [B-6]. Moreover, given a clear authority structure, lower level managers can also be effective sponsors to idea generators under their span of control. Again, for the reasons sighted above, this is particularly true of middle (line) managers. Without the support of line managers, innovators on the "factory floor" would have little chance of having their ideas implemented. As a result, line managers are in a unique position to be both idea generator and "sponsor."

As with any structure, communication problems can interfere with the effectiveness of the line-staff structure. In particular, a lack of communication between the line and staff may result in line managers failing to receive, or even rejecting, assistance or advice that would benefit their unit or the organization as a whole. As an example, Chandler discusses how, at General Motors, line managers "looked on staff men as interfering outsiders and theorists" [B-3]. Thus, when the staff executives at General Motors supported the development of a "radically new type of engine," line managers expressed strong skepticism and reluctance toward the project. Much of this resistance was attributable to the "production headache" for operating managers that would be created by the motor's introduction. Because the staff had no authority to continue development, the resulting stalemate led to the abandonment of a very promising project.

A second, more serious problem that may result from a breakdown in line-staff communication is the intrusion of the staff into the authority structure. If, for example, the executive staff at General Motors had attempted to go over the heads of line managers and gain approval for the engine project from top executives, the function of the line-staff structure (and the benefits associated with it) would be erased. This scenario, although somewhat overstated, is not unlikely. In many organizations, the distinction between the line and staff roles in the decision-making process becomes blurred. As Lawrence and Lorsch note,

"The factual existence of non-line executives doing coordinating work cannot be denied" [B-2].

Although no organization can expect its line-staff structure to function flawlessly, it can take steps to ensure effective communication within the structure. In particular, an organization may wish to ensure effective lines of communication through the formal integration of the line-staff relationship. At General Motors, for example, the top management established "interdivisional committees" to exchange information and consider common problems" [B-3]. The committees, which consisted of line and staff executives as well as general officers in the firm, were established only in areas in which there was a "clear need for better line-and-staff coordination" [B-3]. Initially, this included only the purchasing department, but within a short time, committees were also established to coordinate the general sales area, institutional advertising, and also engineering and other activities [B-3].

The organizational structure top management adopts is the primary determinant of the balance between efficiency and innovation in an organization. In particular, the greater the amount of "slack" top management allows in an organization, the more it supports a structure focusing on innovation. As with lower level management, the decisions top management makes with regard to organization design are far more important and difficult in a highly complex environment. Most of this is due to the increased need to communicate effectively with lower level management and an increased difficulty in achieving this communication, for whereas executives in the container industry could implement their structural changes from above and easily clarify their goals to lower and middle management when necessary, executives in the plastics industry must communicate constantly with a complex web of lower and middle management to ensure that their strategic goals are implemented effectively.

Shrivastava states that "the key top management task is to make strategic decisions and facilitate innovations that ensure long-term survival of organizations" [B-7]. This statement implies that in order to function effectively, top management must be free from day-to-day decision-making. For organizations operating in a complex environment, top management must adopt a line-staff structure for managers at the operating level. This will move operating authority out of the central office and allow top management to focus on "entrepreneurial activities and (to) make the strategic decisions necessary to keep the overall enterprise alive and growing" [B-3].

Assuming top management has effectively structured lower level management to handle operating decisions, the question becomes what is the most effective way to structure top management to handle strategic decisions. In his article, "Learning Structures for Top Management," Shrivastava contends that the "high technology world of modern organizations" demands that top management be structured to facilitate strategic

decision-making and innovation [B-7]. Traditionally, the structure of top management has been similar to the structure of lower level management--it has been based on hierarchical lines of authority and task differentiation. This structure, however, is meant for operational decisions and does little to facilitate long-term decision-making. What is needed is a structure tailored to the unique role of top management.

Shrivastava's structure for top management is based on the use of teams at the highest level of an organization to share strategic decision-making. The advantages to this approach are similar to the advantages of teams at the lower level of management. First, it optimizes resources for information collection because time will not be wasted in the needless duplication of knowledge. This improves the efficiency of decision-making. Second, using top management teams takes advantage of the expertise of several individuals in the solution to a given problem. Third, it promotes "interpersonal trust" and serves as a forum for conflict resolution.

Differentiation is still an important element in this structure, but it is based upon several factors outside of traditional concerns of task skill and authority. First, each top management team is balanced according to technical expertise and knowledge. Second, an effort is made to group the teams along similar styles of decision-making. Third, the structure of a given team is expected to be flexible enough to allow changes in leadership and authority according to strategic expertise. Shrivastava also contends that general structures of authority (hierarchy) will not be lost in the team concept because there will exist "implicit hierarchies that develop out of members' expertise, experience and mutual respect for each other" [B-7].

As a final consideration, Shrivastava introduces several formal structures in which top management teams would function. Two of these are of particular interest. The first is the use of matrix structures based on teams of "professionally qualified experts who have overlapping responsibilities and dual membership in two or more organizational subunits. Each member carries a set of primary responsibilities in his/her area of expertise and another set of responsibilities related to the strategic performance of the organization as a whole" [B-7]. The second is the the use of teams within a "collateral structure" to supplement the original structure when strategic decisions arise. The advantage of this structure is that it creates the least disruption of daily decision-making by top managers.

Whether top management chooses to adopt one of these structures or another structure based on teams depends on factors such as the culture and environment of upper management. But what should not be overlooked is that Shrivastava's structure properly acknowledges the distinction made earlier between the short-term, operational concerns of lower and middle management and the long-term, strategic concerns of upper management. This distinction is particularly important in highly complex organizations in which communication between the two levels of management is a key element in an organization's ability to compete.

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