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# Compensation Strategy for the Future Force

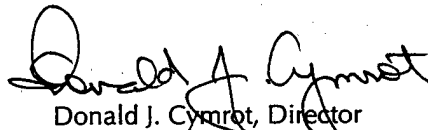
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# Contents

<b>Background and introduction</b> .....	1
<b>Strategy for designing a compensation system</b> .....	3
What should a compensation system do? .....	4
What goals are met? .....	5
What shortcomings can be identified? .....	7
Most of the personnel budget is fixed .....	7
Changes are difficult .....	10
Pay elements weighted toward Navy-specific goals .....	11
Some goals aren't well met .....	11
<b>Evidence of current problems</b> .....	13
Themes from compensation reform literature .....	13
Skill differentials .....	14
Manning levels by rating .....	14
Distribution challenges .....	18
Complexity, rigidity, and unintended incentives .....	19
A complex system of pays, allowances, and benefits .....	19
Rigidity .....	20
Unintended consequences .....	20
<b>Anticipated future problems</b> .....	23
Changes in Navy technology .....	24
Effect of technology on manpower requirements .....	24
The future Sailor .....	25
Changes in civilian labor market .....	27
Age distribution of population .....	27
More youth attend college .....	28
Implications for personnel policy .....	30
Compensating the future force .....	33
Higher pay .....	33
More flexible compensation and career structures .....	34

<b>Guidelines for compensation reform</b> .....	37
Move toward two flexible pay elements .....	38
The case for flexibility .....	39
Economics 101: The price system .....	40
Consequences of inflexible prices .....	40
Allowing prices to move .....	43
Parallels to Navy compensation .....	44
Compensating wage differentials .....	45
Improved economic signals .....	46
Cost-effective retention .....	47
<b>Distribution Incentive Pay demonstration proposal</b> .....	49
The ULB proposal .....	50
Expected benefits .....	50
Management issues .....	51
Long-term evolutionary change .....	52
<b>Conclusions and recommendations</b> .....	55
<b>References</b> .....	57
<b>List of figures</b> .....	61
<b>Distribution list</b> .....	63

## Background and introduction

The Assistant Deputy Chief of Naval Operations, Manpower and Personnel (N1B) requested that CNA analyze the Navy's compensation system in view of current recruiting and manning shortfalls and anticipated future changes in the Navy's workforce. This study will help the Navy implement an effective, market-based compensation system that will give it the ability to attract, retain, and motivate a high-quality workforce in a competitive, dynamic labor market.

Our intent is to take a strategic look at Navy compensation policy and practices. The starting point is to consider what the Navy wants to accomplish with its compensation system. What goals, in terms of managing human resources, can be met through compensation policies and practices? We consider human resource management system approaches, as well as approaches suggested by economics literature, and arrive at a succinct set of strategic goals.

We then assess how well current Navy compensation meets the strategic goals, and where the current system falls short. After identifying a few problem areas by comparing current policies to strategic goals, we validate the procedure to see whether these problem areas correspond to areas in which the Navy is experiencing problems.

Both the strategic exercise and evidence regarding current problems indicate that efforts to improve compensation policy should focus on the areas of allocating people across jobs and providing sufficient skill differentials. In addition, the complexity and rigidity of the compensation system and the incentive structure implicit in some traditional pays create challenges.

We next extend the analysis of the current compensation system to consider what additional problems might arise in the future. A previous CNA analysis [1] suggested that changes in both Navy

technology and civilian labor markets are going to require profound changes in the way the Navy recruits, trains, and compensates enlisted personnel and in the way career paths are managed. These changes will reinforce the need for better distribution incentives, more extensive occupational differentials, and a more flexible compensation system.

Finally, we propose guidelines for reforming the compensation system that will enable strategic goals to be met and current and future manning problems to be addressed. The Distribution Incentive Pay Demonstration Project, one of the Navy's current Unified Legislative Budget compensation proposals, is advanced as a method of moving forward with strategic reform of the compensation system.

## Strategy for designing a compensation system

Policy initiatives from the first Quadrennial Review of Military Compensation (QRMC) in 1967, through the President's Commission on Military Compensation in 1978, to the 9th QRMC in 2000 have cited urgent needs to reform the military compensation system. Similarly, researchers from Cooper (1977) through Binkin and Kyriakopoulos (1981), Warner (1981), Horne and Gilroy (1991), and Asch and Warner (1994) have pointed out major difficulties with military compensation [2, 3, 4, 5, 6, 7].

In spite of widely agreed-on shortcomings and repeated calls for reform, however, the basic structure of the military compensation system has remained largely unchanged. The largest component of military pay is basic pay, which is determined by rank and length of service, with separate tables for officers, warrant officers, and enlisted. The next largest are the Basic Allowances for Housing (BAH) and for Subsistence (BAS), determined by rank, length of service, marital status, and location. The final large component is retirement pay, which has no vesting until 20 years of service but allows retirement with an immediate annuity after 20 years. These three components, plus social security payments, account for more than 86 percent of military pay.

The remaining 14 percent includes a complex array of moving cost reimbursements, cost-of-living allowances, uniform allowances, and special and incentive pays. All military pay is subject to law and changes must go through the joint service Unified Legislative Budget (ULB) process and then be approved by Congress.

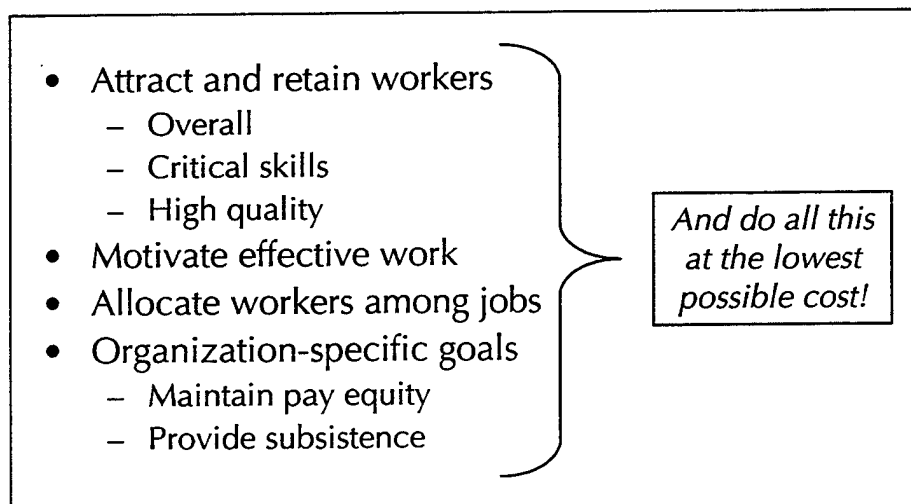
It is tempting to attribute the scarcity of major reform over the 25 years of the All-Volunteer Force (AVF) to inertia, traditional military culture, and the political difficulty of building consensus for change and working proposals through the approval process. Examining the range of goals that the military attempts to meet through its compensation system, though, suggests that some of the

seemingly inexplicable features of military pay exist to meet goals that are unique to the military or to meet more standard compensation goals within the constraints imposed on military organizations. Successful compensation reform, then, will require that more attention be paid to military-specific goals and constraints.

## What should a compensation system do?

How do employers set wages and why do they pay different employees different amounts? Ideally, compensation is set to advance the goals of the organization. To identify goals for the Navy compensation system, we looked at sources from both the economics literature [8, 9] and from the human resource system literature [10, 11, 12]. Figure 1 summarizes some of the most basic goals that the Navy might achieve using a strategically designed compensation system.

Figure 1. What should a compensation system do?



We describe the goals in figure 1 as follows:

- **Attract and retain the right people.** First, set overall compensation levels so that a typical employee with the necessary qualifications can be hired and kept on board. Second, set pay

in some critical skill areas differently so that people with a different set of qualifications can be attracted and retained. Third, induce the most productive people to join and stay with the organization.

- **Motivate people to work effectively.** Working effectively includes both being as productive as possible and tailoring work efforts to meet the goals of the organization.
- **Allocate workers among jobs.** This could include compensation that induces the best people to try for advancement as well as inducing people to accept “hard-to-fill” jobs.
- **Meet organization-specific goals.** The Navy has unique goals that may be incorporated into compensation structures. For example, military organizations put a high value on unit cohesion and teamwork and believe that high degrees of inequality in pay will undermine these goals. Another unique goal of military compensation has been to take care of service members and their families by providing for their subsistence.

In meeting their compensation goals, organizations are usually subject to the constraint of keeping personnel costs as low as possible.

## What goals are met?

Table 1 aligns the major types of pay in the current compensation package with the goals that they can help to meet. For example, basic pay, which varies with rank and length of service (LOS), helps to attract and retain all Navy personnel because it's the major component of everyone's paycheck. It helps to encourage the best people to join, stay, and work hard because it increases with rank and promotions are competitively allocated to the best performers. It can also provide pay differentials across occupations if promotions are more rapid in some ratings. The basic pay tables are closely linked to the equity goal because every servicemember with the same rank and LOS receives the same basic pay. Finally, basic pay helps to provide subsistence by giving all servicemembers a minimum set pay.

Table 1. Goals met by current Navy compensation system

Type of pay	Compensation system goals						
	Attract and retain—overall	Attract and retain—critical skills	Attract and retain—high quality	Motivate effective work	Allocate across jobs	Promote equity	Provide subsistence
Basic pay	Yes	Yes, through faster promotion				Yes	Yes
Allowances	Yes				High housing cost areas	Yes (except married vs. single)	Yes
Retirement	Yes	Yes, through faster promotion				Yes	Yes (old age)
Accession and continuation		Yes			Occupations		
Sea, sub, diving, etc.		Yes			Arduous duty, occupations	Yes	
Hardship, SDAP, family separation					Arduous duty	Yes	
COLAs					High cost areas	Yes	Yes

Allowances, primarily BAH and BAS, vary with marital status and local housing prices as well as rank and LOS. These allowances are a significant component of total pay and therefore contribute to the goal of setting overall pay high enough to attract and retain workers. Because rank and LOS, but not occupation, determine allowances, allowances also further the goal of everyone fighting side by side having the same pay. However, allowances are higher for married people, leaving room for possible feelings of ill treatment among single people.

Retirement pay is based on basic pay and reinforces its goals while shaping career lengths and retirement times. In addition, retirement pay allows the military to take care of its members into their old age.

Accession and continuation pays (i.e., Selective Reenlistment Bonuses (SRBs), Enlistment Bonuses (EBs), and medical specialty pays) are the Navy's primary method of providing occupational differentials. These pays are fairly flexible, allowing the Navy to determine the ratings and skills to be offered bonuses, the size of the award within broad eligibility, and award maximums determined by

Congress and DoD. Two features of bonuses that may merit discussion are whether bonuses should be part of the formula for determining retirement pay and whether more stable skill differentials paid at more regular intervals would provide better incentives for people in well-compensated occupations to choose military careers.

The condition-based pays range from COLAs, to arduous duty pays (such as sea pay), to proxies for occupational pays (such as submarine pay). These pays are generally a patchwork that is used to meet, as well as possible, the goals of attracting and retaining critical skills and allocating people across jobs.

Looking at the matrix in table 1, we can see that existing pays cover some goals fairly well, but not others. In particular, there seem to be quite a few pays that are aligned with the goals of overall pay adequacy and the Navy-specific goals of equity and subsistence. On the other hand, increased pay through promotion is the only mechanism for attracting and retaining high-quality personnel and motivating effective work. Also, with the exception of SRBs and EBs, the tools for attracting and retaining critical skills and allocating people across jobs are a complicated system of workarounds and proxies with limited flexibility.

## **What shortcomings can be identified?**

### **Most of the personnel budget is fixed**

One of the most important facts about military compensation in general, and Navy pay in particular, is that very little of the total compensation budget is in discretionary categories and that, even in these categories, the amount of discretion is limited. In the truest sense, a discretionary pay would be one that the appropriate level of command had the authority to vary in order to meet the Navy's strategic pay goals. DoD budgets, however, have an assortment of pays in the categories they designate as discretionary, not all of which would satisfy our definition.

Table 2 shows the major personnel budget categories. Most of the pays that DoD calls discretionary fall into the three italicized categories: special and incentive pays and some allowances. Thus, in FY 1999, less than 7 percent of the total Navy personnel budget was in discretionary categories. In spite of many reform initiatives, the relative amount of discretionary pay has not grown much over time. For all services, in 1968 special pays were only 6 percent of total compensation, and only 3 percent by 1978 [3].

Table 2. Navy compensation budget, FY 1999 budget request

<b>Budget category</b>	<b>\$M</b>	<b>%</b>
Basic pay	8,399	50
Retired pay accrual	2,534	15
Basic allowance for housing	1,952	12
Subsistence	882	5
<i>Incentive pay, hazardous duty, and aviation career<sup>b</sup></i>	210	1
<i>Special pays<sup>b</sup></i>	723	4
<i>Allowances<sup>b</sup></i>	400	2
Separation payments	255	2
Social security tax payments	722	4
PCS travel	634	4
Other military personnel costs	100	1
Midshipmen	38	0
Total	16,849	100

Source: These figures are taken from the FY 2000 President's budget. The amounts are the summary of entitlements by subactivity and give the FY 1999 total of officer and enlisted pay.

<sup>b</sup> Discretionary pays mostly fall under the incentive and special pay categories, with the allowance category containing some Cost of Living Allowances (COLAs).

Table 3 shows the Navy pays that fall in the 7 percent of the personnel budget categorized as discretionary. The largest 11 pays, those highlighted in table 2, account for 94 percent of discretionary pays.

Table 3. Discretionary pays

<b>Special pays</b>	
Sea duty	230
Physicians, dentists, nurses	165
Reenlistment bonus (SRB)	155
Special duty assignment pay (SDAP)	53
Enlistment bonus (EB)	41
Nuclear officer incentive pay	29
Diving duty pay	12
Nuclear accession bonus	2
Certain places	2
Foreign language proficiency pay	2
Responsibility pay	1
Overseas extension pay	1
Psych diplomate pay	1
Other special pays	29
	<b>723</b>
<b>Incentive pay, hazardous duty, and aviation career</b>	
Flying duty pay	109
Submarine duty	72
Parachute jump pay	5
Demolition pay	3
Other incentive pays	21
	<b>210</b>
<b>Allowances<sup>a</sup></b>	
Station allowances overseas	185
Family separation allowance (FSA)	38
CONUS COLA	6
	<b>229</b>
<b>Total discretionary pays</b>	<b>1,162</b>

Source: see table 1

- a. Total allowances here do not equal table 1 because the uniform or clothing allowance has been excluded since it isn't discretionary.

Some of the pays in table 3 can be thought of as compensating people for accepting assignments or career fields that involve special hardships or dangers. Examples include sea pay, SDAP, dive pay, flight pay, submarine pay, and FSA. These pays sometimes help to allocate people across jobs; for example, sea pay encourages people to take sea assignments. The pays may also help attract and retain people in critical fields; for example, dive and submarine pay help to man these traditionally hard-to-fill communities.

Another set of pays encourages people to join or reenlist in the Navy. Examples of accession, retention, and continuation bonuses include medical pays, SRB, EB, and nuclear officer incentive pay. To the extent that the Navy targets these pays by rating, NEC, or medical specialty, they can be used to attract and retain people in critical occupations.

The final set of pays compensates people for the high cost of living, such as the station allowances overseas (the largest component of which is the Overseas COLA) and the CONUS COLA. These pays are included because they can encourage people to take jobs in high-cost areas, so they help to meet the goal of allocating people across jobs. However, the amount of discretion in these pays is limited because they are usually tied to standardized cost-of-living calculations. As a result, there is little flexibility to adjust pay in response to manning shortfalls.

## **Changes are difficult**

An organization may need to change its compensation system or pay levels for many reasons. First, as organizations' missions and roles evolve over time, the strategic goals they aim to accomplish through compensation may change. Second, even if goals don't change, both the Navy and its Sailors are affected by many complex factors. Naval technology may change so that Sailors with different skills are needed. The civilian economy may move from a recession into full employment, or particular skills may be subject to surges in demand. Demographic, educational, and social changes, such as growing youth cohorts, more high-school graduates going on to college, or more working wives can also alter the effectiveness of current compensation policies. As part of a dynamic economy, the military needs the ability to respond quickly to changing labor market conditions.

The military pay system, however, is notoriously inflexible. Most pays are set by law and require joint service agreement and congressional approval to change. Authority to change pays rarely rests at the appropriate level—the level that observes impending manning problems and must suffer the consequences. Instead, the change process is cumbersome and lengthy.

## **Pay elements weighted toward Navy-specific goals**

Referring back to table 1, three goal columns seem to have the most pay elements supporting them: attracting and retaining enough people overall, promoting equity, and providing subsistence. The overall manning and equity goals tend to work together, reflecting a fundamental belief that the ultimate role of every servicemember is warfighting and that pay should reflect this underlying equality. Another aspect of the warfighting role is that the pledge to go into harm's way to serve one's country in itself deserves compensation.

Providing subsistence to servicemembers and their families is important to a military that wishes to be seen as an institution to which people belong, rather than an employer that simply hires workers. The institutional framework also explains some of the unique benefits provided to servicemembers, such as Morale, Welfare, and Recreation (MWR) programs. As an institution, the military assumes a greater obligation to take care of its members than an employer may to care for its employees.

Another feature of table 1 is the importance of the promotion system. The primary method for rewarding performance in the military—through promotion and pay—is heavily tied to rank. This again reflects a goal to reward people who develop the military knowledge, discipline, and leadership skills needed to advance in rank.

It isn't our purpose to belittle the goals of the military. Instead, understanding the importance of these goals helps us to understand that the current pay system has had legitimate reasons for persevering in spite of the reformers' zeal. A successful reform effort will have to recognize these organization-specific goals and include or preserve pay elements that support them.

## **Some goals aren't well met**

Having acknowledged the legitimacy of Navy-specific goals, there are other goals that Navy compensation has great difficulty meeting. In particular, tools to allocate people across jobs are imperfect, and attracting and retaining people in some critical skill areas is difficult because private-sector occupational differentials can't be matched.

In the following section, we will demonstrate that the Navy has had and continues to have serious manning difficulties that can be tied to the lack of flexible incentive pays. Furthermore, we argue that the situation can only grow worse because the world is changing in such a way that the military will increasingly have to compete directly with private-sector employers who can provide greater pay and career flexibility.

A common argument against increasing assignment and occupational differentials is that they will undermine the equity goal and hence hurt morale and unit integrity. Although this is a serious concern, and we advocate maintaining a significant portion of compensation in the traditional pay tables to continue to meet the equity goal, several points can be made to justify pay differentials:

- Pay differentials exist in the Navy today. On the enlisted side, SRBs and EBs, as well as sea pay, submarine pay, nuclear pay, and other special pays, create significant pay differentials. On the officer side, there are even higher pay variations for doctors and other professionals.
- Housing and subsistence allowances create pay differentials by marital status. An implicit assumption of this system is that single servicemembers will accept lower allowances to serve the goal of providing subsistence for military families. Why, then, is it less likely that servicemembers in lower-paid skills will accept occupational differentials to serve the goal of keeping good people in higher paying jobs that are critical to the success of their unit's mission?
- An analogy can be drawn to a football team, in which a star quarterback is paid more than the offensive linemen. Although the linemen may resent his higher salary, it isn't likely that they'd want the quarterback's pay to be lower. This is because they recognize that good quarterbacks are in great demand and without the high salary they wouldn't have a good quarterback and a winning team. In the same way, many Sailors recognize the need to pay network administrators and electronic technicians more in order to keep good people in those critical jobs.

# Evidence of current problems

## Themes from compensation reform literature

We are far from the first researchers or policy-makers to think about how military compensation could be improved. Mention was made earlier of policy initiatives and research papers reaching back even before the beginning of the AVF. Some common themes emerge throughout the research and policy papers. Even the earliest papers say that military pay structures were designed to support an obsolete type of force in which military technology and missions required youth, vigor, and a limited variety of skills. The result was the single pay table with rewards tied to longevity and rank, but with no occupational pay differentials [2, 3, 4].

Other widely discussed problems include the relatively small amount of discretionary pay available to support goals from attracting and retaining people in occupations with high civilian pay, to rewarding performance, to filling hard-to-fill billets. In addition, the military retirement system and the complicated allowance systems have come in for frequent criticism. Reference [13] summarizes some of the findings of other studies and their suggestions for compensation reform.

In this section, we will concentrate on evidence of problems related to the shortcomings identified by our analysis of how well the Navy compensation system aligns with its strategic goals. In particular, we'll look at whether the lack of occupational differentials and distribution incentives has contributed to manning problems. We'll also summarize some of the difficulties caused by the complexity and inflexibility of the military compensation system.

## Skill differentials

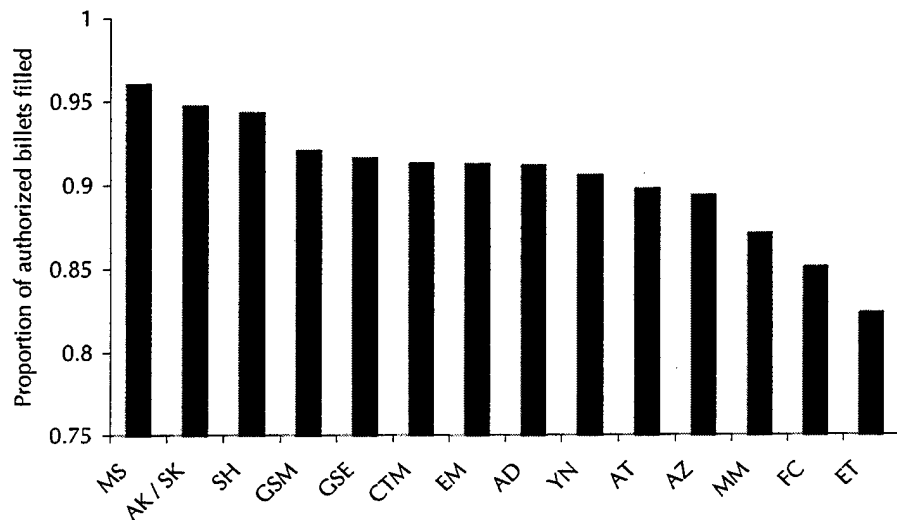
A companion paper in this study examines compensation and occupational manning shortages in detail [13]. This section summarizes some of the findings.

### Manning levels by rating

Our strategy for identifying manning problems is to examine, on a rating-by-rating basis, the proportion of authorized, active-duty billets that are filled. This examination of manning levels allows us to assess the degree to which ratings are undermanned, if at all, and how these degrees have changed over time. If a rating is significantly undermanned (i.e., the proportion of billets that are filled is low), we assume that this reflects difficulties either recruiting individuals into or retaining personnel in this rating.

Figure 2 displays FY 1998 manning levels of E4 to E6 billets. It is clear that there is significant variation in manning levels from one rating to the next. While some ratings have fairly high manning levels (e.g., MS, SH), others have fairly large manning shortfalls (e.g., FC, ET). In many cases, these FY 1998 levels reflect worsening manning shortfalls over the FY 1991 to 1999 period.

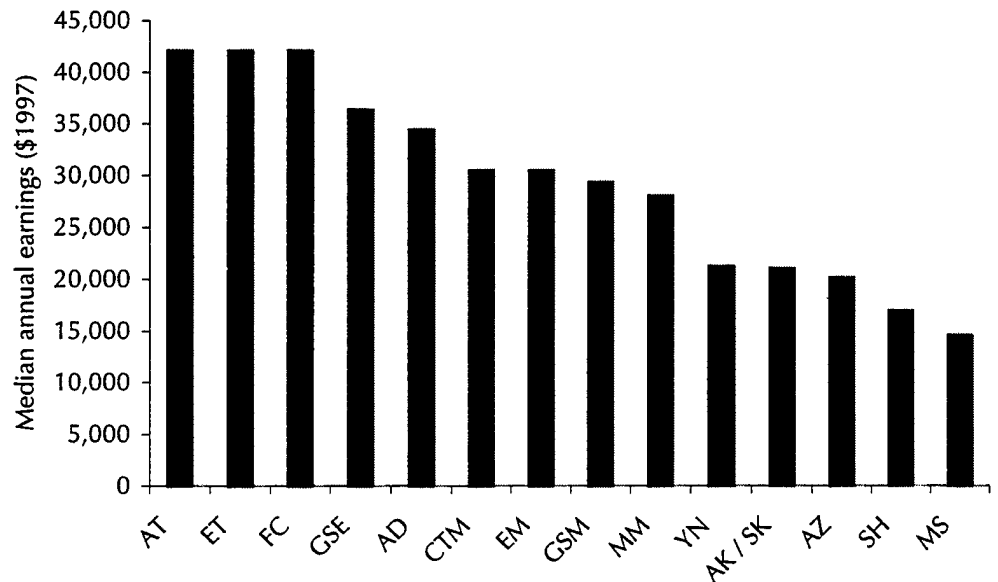
Figure 2. E4 to E6 bodies relative to billets authorized by rating, FY 1998



### Civilian earnings opportunities

Figure 3 presents data on the earnings opportunities available to enlisted personnel in the rating selected in our analysis. Ratings are ranked by median annual income earned by individuals in comparable civilian occupations; civilian earnings are calculated using the 1992–1999 March CPS for full-time, full-year workers, ages 18 to 30, with some college education or less.

Figure 3. Median annual earnings in comparable civilian occupations



In general, ratings requiring more technical skills have civilian counterparts with higher annual earnings than less technical ratings. Furthermore, there is substantial variation in civilian earnings opportunities from one rating to the next. A comparison of figures 2 and 3 indicates a strong relationship between ratings with manning shortfalls and the level of earnings found in comparable civilian occupations. In fact, the ratings with the highest civilian earnings opportunities (AT, ET, and FC) all had manning shortfalls in FY 1998; indeed, the ET and FC ratings have the largest manning shortfalls of all the ratings considered in this study.

### **Military vs. civilian occupational pay differentials**

Figures 2 and 3 demonstrate that, in general, ratings with the most significant manning shortfalls have the largest civilian earnings opportunities. While this is consistent with many preconceptions, it is less well known that these ratings also have the highest levels of military compensation. Differences in earnings across occupations come primarily from two sources: selective reenlistment bonuses (SRBs) and differences in advancement rates. Our analysis suggests that ratings with relatively large manning shortfalls are also those occupations with high SRBs and relatively fast advancement rates. This relationship implies that the Navy has a good sense of which ratings have severe manning shortages and that efforts are being made to alleviate these shortfalls through the provision of monetary incentives.

The existence of manning difficulties, despite high levels of military compensation, does not imply that military compensation is an ineffective tool to attract and retain personnel. Rather, our analysis suggests that the current levels of compensation are not sufficient to address the manning problems faced by these highly technical ratings. In other words, greater variation in military compensation would help to alleviate manning shortfalls. Higher compensation levels in some ratings would encourage more recruits with the required aptitudes to join the Navy and might also result in some high aptitude recruits to choose different ratings.

To demonstrate this point, table 4 presents FY98 earnings differentials within the military and in the civilian sector. Ratings are listed in descending order by their FY98 manning levels.

The first column compares military earnings at 45 months of service of the median individual in each rating with those of the median individual in the MS rating. For each rating, the "median individual" is an E4; differences between ratings at the median, then, occur due to differences in the median SRB from one rating to the next. The median SRB for an MS is zero in FY98, so column 1 measures the percentage increase in earnings associated with receipt of the median SRB offered in a rating.

Table 4. Military vs. civilian occupational differentials  
(percentages)

Rating	Military		Median civilian differential
	Median differential	Maximum differential	
AK / SK	100	153	138
SH	100	135	130
GSM	111	150	207
EM	109	191	197
AD	100	169	204
YN	100	147	156
AT	116	169	267
AZ	100	147	152
MM	114	191	203
FC	139	187	267
ET	122	191	267

The data in column 1 confirm that there is some variation in military compensation from one rating to the next, even holding length of service and paygrade constant. While about half of the ratings on which we focus have the same median earnings as an MS, other ratings have between 9 percent (EM) and 39 percent (FC) higher earnings than an MS.

In contrast, earnings differentials in the civilian sector are significantly larger. The third column displays, for each rating, median civilian earnings for an individual with 45 months of service to the median civilian earnings for an MS. In the civilian sector, earnings differentials range from 30 percent (SH) to earnings more than 2.5 times as high (AT, ET, FC). In no case do median differentials in the military come close to approaching the median differentials in the civilian sector.

Furthermore, the maximum observed differentials in the military do not even match the median differentials in the civilian sector. The second column displays the largest observed differentials for individuals with 45 months of service. For each rating, the highest observed levels of compensation are compared to the lowest observed levels of compensation for an MS. These differentials are, by definition, larger than the median differentials for the military, and range from 35 percent (SH) to 91 percent (EM, ET, MM). Even in

the most extreme scenario, occupational differentials in the military do not match the variation in earnings found in the civilian sector. In addition, ratings that come the closest to matching differentials observed in the civilian sector usually have the highest manning levels, whereas ratings with the greatest manning shortages are those for which the civilian differentials dwarf those found in the military.

## Distribution challenges

The Navy is facing some major difficulties in the personnel world, specifically in the area of distribution and assignments:

- Manning shortages or billet gaps in sea billets and selected shore billets
- Nonmonetary incentives that constrain the distribution system and further exacerbate sea manning shortages, in particular the use of sea duty credit for some overseas shore billets and neutral duty
- Geographic instability with its associated high crew turnover, high PCS costs, transient and retraining costs, and family disruption
- Low retention (particularly for sea-intensive skills) and Sailor dissatisfaction.

Many of these problems are caused at least partially by a distribution system that has inadequate incentives to balance the Navy's needs with the Sailor's preferences. Consequently, the Navy must rely on a combination of things:

- A share-the-pain approach to assignments—frequent moves between good and bad duty stations.
- Non-monetary incentives—various methods to try to entice volunteers to either go to or remain in difficult-to-fill billets.
- Other special pays that act as imperfect proxies for distribution incentives. For example, overseas COLAs compensate for differences in price levels, but not for other amenities or disamenities associated with certain overseas duty stations.

Ultimately, retention is affected in part because Sailors are forced to move frequently and go where they are least inclined to go. In addition, because the Navy cannot always keep its promises, Sailors are sometimes disappointed about where they are going and how long they are going to be there.

## **Complexity, rigidity, and unintended incentives**

### **A complex system of pays, allowances, and benefits**

Most analysts agree that the military compensation system contains too complicated an array of special pays and benefits [14, 15, 16]. Such issues as the tax advantage of allowances, the proliferation of relatively small special and incentive pays, and the lack of visibility of benefit costs make it hard for servicemembers to put an accurate value on their total compensation. This can hurt the military if people perceive their earnings as being lower than their actual total compensation cost. In addition, it's costly to administer such a complex pay system.

The Navy uses over 50 different pays and allowances to compensate Sailors. The basic pay tables are fairly simple, but beyond that, complexity rules. For example, duty location, rank, sea versus shore duty (for E5s), marital status, whether married to another servicemember, and child support payments all affect the Sailor's eligibility for an individual housing allowance. There are more than 25 different duty- or condition-based pays, of which Medical occupational pays constitute the largest group. Pays in this category are not tied to the individual's contract renewal but rather are typically attached to assignments or skills.

In addition to pays and allowances, the Navy offers Sailors many non-wage benefits, including a generous retirement benefit. Other benefits Sailors receive include annual leave, educational opportunities, subsidized child care, commissaries and exchanges, and family assistance and other services. Medical care is provided free of charge on base and through CHAMPUS. Finally, there are numerous programs to promote health and well-being, such as physical fitness and entertainment facilities.

## **Rigidity**

A related issue is the relative inflexibility of the military pay system. Most pay changes are subject to joint service and legislative approval, thus requiring lengthy periods to change. To illustrate the extent of legislative oversight, a recent Unified Legislative Budget (ULB) package contained 28 initiatives to change laws regarding military personnel compensation. These initiatives ranged from important issues, such as sea pay reform, to seemingly micro-managed issues, such as parking reimbursement for recruiters.

As a result of the joint service and congressional approval process, when changes occur in the needs of the services, attitudes of servicemembers toward different types of assignments, or civilian alternatives, the services cannot respond quickly to change compensation packages. Because we anticipate that technology and labor markets will become even more dynamic in the future, this lack of pay flexibility will become an even larger problem.

To improve its ability to respond to change, the Navy has begun incorporating as much flexibility as possible into its legislative proposals. For example, current SRB statutes and the sea pay reform proposal allow the Secretary of the Navy to vary bonus amounts within a range given by the law.

## **Unintended consequences**

With its complex and inflexible array of pays, it should not be surprising that the military compensation system sometimes results in incentives that may have nothing to do with, or even interfere with, strategic goals. Figure 4 shows one example that arises from an allowance system that provides higher payments to married personnel.

Figure 4. Incentive structure may have unintended consequences<sup>a</sup>

		<b>Single</b>	<b>Married</b>
		\$15,100	\$21,300
		+ shipboard berth	
8% pay increase	E3 ↓ E4	\$16,300	\$23,000
		+ shipboard berth	
			41% pay increase

a. Reference Sailor is E3 at LOS 4, single, on sea duty in Norfolk. Annual compensation includes base pay, BAH I or partial BAH, and partial BAS. BAH I (without dependents) is \$5,200 per year.

The increase in compensation due to marriage results from the change in housing eligibility. For junior Sailors living on board ship, marriage means being allowed to live off the ship and drawing housing allowance at the with-dependent rate. In this example, an E3 getting married draws an additional \$6,200 per year, an increase of 42 percent. Theoretically, the shipboard berthing has value, so the effective increase may not be the full increase in cash compensation. However, anecdotal evidence suggests that Sailors have a low valuation of shipboard berthing.

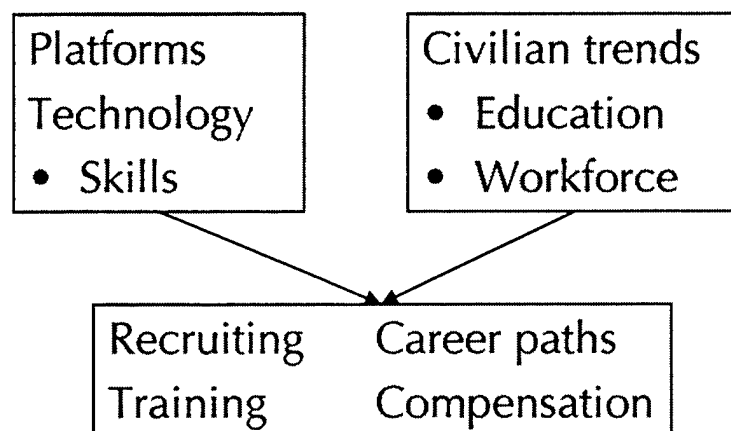
How does this return compare to the return due to superior performance? The return to promotion, the increase in pay by advancing to E4, in this example is about \$1,200 per year. Getting married provides four times more cash than does a promotion.

As Sailors advance in rank, the marriage premium erodes but does not disappear. Once a Sailor receives BAH as a single Sailor (as an E5 or higher), BAH increases due to marriage range from \$2,000 to \$2,500 per year—roughly equivalent to the additional compensation from advancing in rank.

## Anticipated future problems<sup>1</sup>

In the 21st century, the traditional ways of manning Navy ships, submarines, and squadrons will change. Two compelling sets of forces will be at work. First, technological advances and budget pressures are combining to produce a new generation of platforms and systems with significantly reduced manning. Along with reduced manning, the new technology will require enlisted personnel with skills significantly different from those of today's Sailor. Second, the civilian population and labor force are changing. Figure 5 depicts the changes in technology and the civilian labor force and how these forces may require fundamental changes in how the Navy recruits, trains, retains, and promotes personnel.

Figure 5. Anticipated changes in 21<sup>st</sup> century



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<sup>1</sup> This section contains a synopsis of a previous CNA study. References [1] and [17] contain more detail.

## Changes in naval technology

Between now and 2020, the Navy plans to introduce new platforms, equipment, and systems—some with profound changes in technology and manning. We surveyed the new platforms and also some technology initiatives that cut across platforms. The programs we examined include Smart Ship, LPD 17, DD 21, CVN 77, CVX and the Joint Strike Fighter. Research programs and technology initiatives we examined include the Ship Systems Automation (SSA) study, Multi-Modal Watch Station (MMWS), Integrated Command Environment (ICE), intelligent automated sensors, agent-based systems, condition-based maintenance, and advanced embedded training. We also considered the implications of acquisition reform for future manning.

We collected information through interviews, participation in working groups, and a literature review that included material from Internet sites. We talked with scientists; human factors engineers; manpower, personnel and training (MPT) experts; and Navy officers from systems commands, program offices, research organizations, Naval Warfare Centers, contractors, resource sponsors, and MPT offices.

### Effect of technology on manpower requirements

The effect of technology on manpower requirements will differ across platforms. Nevertheless, some common themes emerge across the new platforms, systems, and acquisition programs:

- Automation of routine tasks and information processing, including more collaboration between human and machine in which the human adds context and makes complex decisions
- Reduction of maintenance and watchstanding requirements
- Movement of workload from operational units to the shore because of new information technology
- Extensive use of embedded trainers and decision support simulators

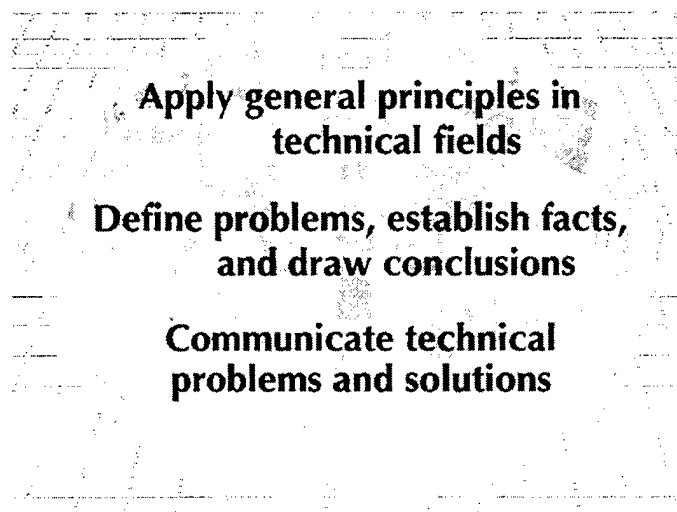
- Use of more commercial-off-the-shelf (COTS) technology
- Change in makeup of future crews from specialists to generalists.

In almost all areas, including combat systems, command and control, engineering, maintenance, material handling, and hotel functions, automation will have progressed to the point where humans are overseeing complex, automated systems—providing context, coaching, and making decisions. Automated information processing will have progressed to the point where the machines will do most of the routine work currently done by humans and provide operators with knowledge rather than data. The operators will work “on-the-loop,” that is, will not be an integral part of the routine processing but will intervene when problems arise and use the knowledge provided by the machines to make decisions.

### **The future Sailor**

Given these trends, we see a growing requirement for a future Sailor who is a knowledgeable decision-maker. The Navy will still need unskilled labor to perform tasks that can’t be automated, and it will still need supervisors and military leaders. But an increasing proportion of the Navy’s enlisted force will be Sailors whose resumes include the qualifications shown in figure 6.

Figure 6. Future Sailor’s qualifications



As technology advances, people often wonder whether skill levels will rise or fall. With the new Navy technology, some argue that interfaces will improve and skill levels will fall to the equivalent of playing a computer game. Others worry that the new technology will be so complicated that it will require a crew of Ph.D. computer scientists. We found that the consensus among experts, as well as the lesson from history, is this: As technology gets more advanced, the workforce tends to become more skilled rather than less skilled, and required skills change. In part, new skill requirements depend on the quality of human-machine interfaces (HMI), which in turn depend on today's R&D efforts.

Today's Sailors include highly skilled technicians, but their skills often consist of being able to operate, troubleshoot, and repair equipment that is generally specific to the Navy or military. Some of these skills are transferable to civilian jobs, but others are of value only within the Navy. In this way, the Navy is somewhat protected from direct competition with civilian employers.

The future Sailor will need less knowledge about specific equipment and machinery but will have to master some technical field, such as acoustics, electrical engineering, or automated production processes. The Sailor will have to know the field well enough to apply his or her knowledge in new and unexpected circumstances. He or she will have to analyze problems, draw conclusions, reach decisions, and have excellent communication skills—not only technical skills to interact with the machines but human communication skills to reach up and down the chain of command and across distributed networks.

Unlike in the past when the specific nature of military technology and skills insulated the services, the type of skills needed by the future Sailor will be in high demand throughout the economy. Many businesses and industries will need employees with exactly the same knowledge and skills. Together with the introduction of more COTS technology, this means that the military will come under increasing pressure to offer work and compensation packages that can stand up to the pull of attractive civilian alternatives.

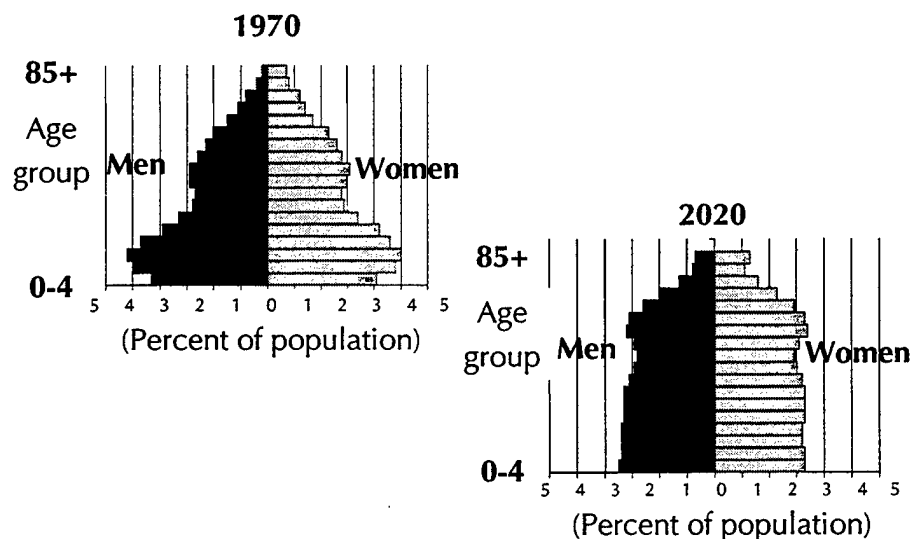
## Changes in civilian labor market

At the same time that technological advances are changing workforce requirements, we will see significant changes in civilian education and labor markets.

### Age distribution of population

One important change is that the age structure of the population is undergoing a profound, historic change. Traditionally, a population is distributed by age in the form of a pyramid—with a relatively small group of older people at the top, a middling amount of middle-aged people in the middle, and large numbers of young adults, teenagers, and children as the base. As figure 7 shows, as recently as 1970, this was a good representation of the American population.

Figure 7. From pyramids to pillars



Two interacting trends have transformed that historic pattern.

- First, life expectancy has grown, and it is continuing to grow. Some demographers think that a baby born today has a life expectancy of 95 to 100 years.

- Second, the United States is continuing the pattern seen through most of the 20th century of having just enough children to replace the population (i.e., a little over two children per woman). This is a pattern that demographers consider a norm for economically developed countries.

Taken together, these two trends—longer life expectancy and stable fertility—give the population more older people, while keeping about the same number of young people. As a result, older people naturally make up a larger part of the population. So even with relatively high levels of immigration, the American age structure no longer resembles a pyramid but rather a pillar: it features roughly equal numbers of people in all age groups.

Because most people now survive childhood, adolescence, and middle age, each person added to the population has a much longer and a much more varied life span, especially during the productive years. Life expectancy at birth in the United States has grown by 20 years since 1929. Some people jump to the conclusion that a longer life span means more sick, old people—that increasing longevity is adding unhealthy years on to the end of life. But research indicates that healthy life expectancy is growing just as fast as life expectancy. A new standard of energy and vitality in the population has pushed old age well into the 70s and beyond.

At the same time that productive life spans are increasing, technology is creating requirements for more people who can think, evaluate, and make decisions. This suggests that the Navy consider recruiting for mid-career positions among older people, perhaps people who have previously been in the military. A possible model is for the services to make it easier for people to move into and out of active service. Career change is becoming common in the private sector, as technology continues to change jobs and as work lives lengthen. It may be possible for the Navy to capitalize on this trend if it can introduce more flexibility into its typically rather rigid career paths.

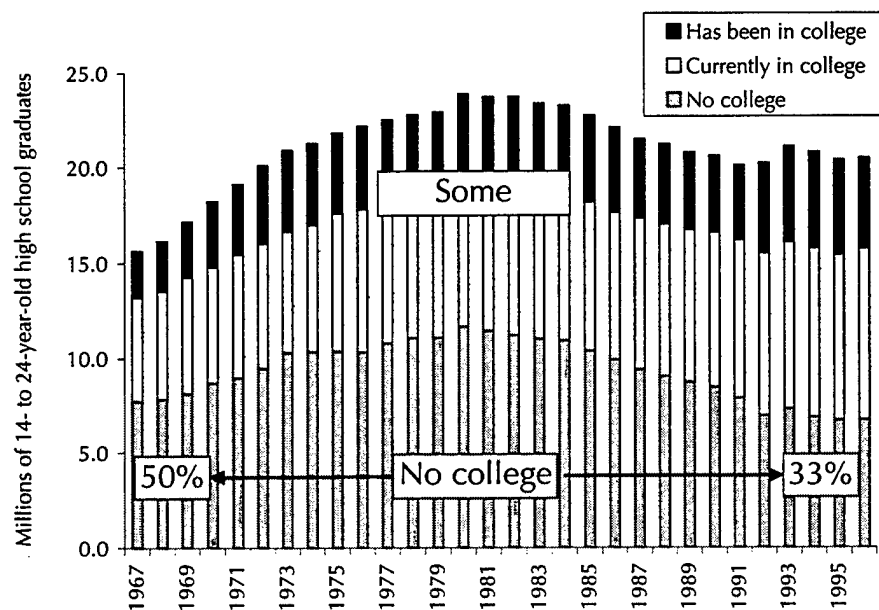
### **More youth attend college**

Traditionally, most enlisted recruits have had no more than a high school education. There have been some attempts to recruit

community college graduates, but so far they have not been extensive [18]. Thus, using current practices, high school graduates who go on to postsecondary schools are not part of the Navy enlisted recruiting pool.

Figure 8 shows trends in the number of high school graduates who don't go on to college. This figure shows the percentage of 14- to 24-year-old high school graduates by whether they were currently in college, had been in college, or had never been in college. Although 50 percent of the 1967 high school graduate pool had not been in college, only 33 percent of the 1996 pool had not. By relying on only high school graduates with no plans for postsecondary education, the Navy is targeting a shrinking proportion of the youth population.

Figure 8. Fewer people stop education at high school



Many of the students who go on to postsecondary school are entering programs that are directly relevant to the Navy's current and future manpower requirements. In 1995, there were about 180,000 awards below the Bachelor's level in fields corresponding to Navy occupations (excluding health sciences). These fields included precision production trades, mechanics and repairers, engineering-related technologies, and computer and information sciences. In

addition, the growing and entrepreneurial technical school and community college market is continually offering new degrees and experimenting with new instruction techniques. It is also more and more common for postsecondary schools to partner with employers to create customized curricula.

Previous CNA research has already made a strong argument for making more use of civilian postsecondary education and training [19]. These arguments can only become stronger as Navy technology continues to advance, required skills become less Navy-specific, more COTS technology is used, and relevant civilian educational opportunities proliferate.

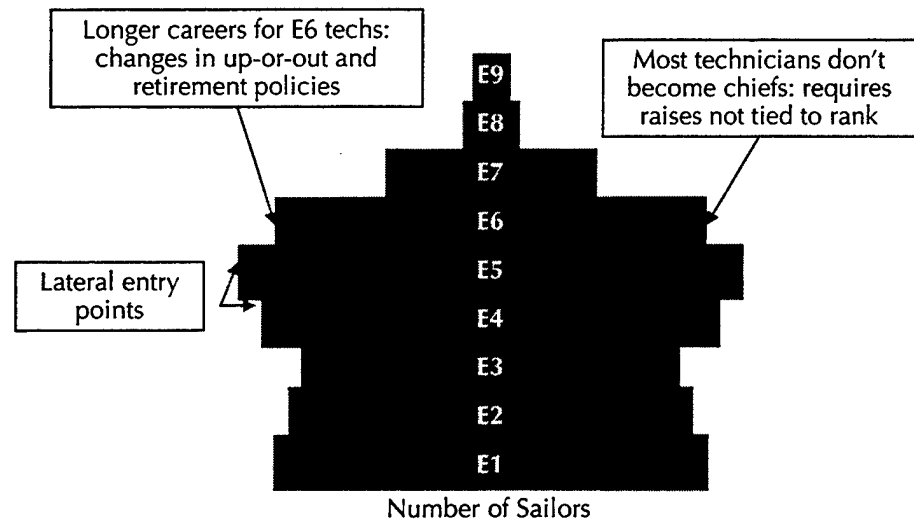
## **Implications for personnel policy**

Changes in technology and required skills, along with simultaneous changes in civilian labor markets, imply that the Navy will have to make fundamental changes in the way it manages its workforce. Military services have traditionally used a promote-from-within labor force in which career paths and pay schedules are designed primarily for generalists who progress gradually from entry-level to leadership positions. In the traditional manpower pyramid, high junior paygrade requirements are driven by the need for strength and vigor to operate older military technologies. Requirements for senior leaders drive up-or-out policies that curtail careers of officers and enlisted personnel who are not selected for promotion to the next level of responsibility.

Given the anticipated changes in naval technology, however, manpower requirements will no longer be pyramids. Automation of routine tasks will lower junior-paygrade requirements while the increasing proportion of skilled technical decision-makers will require more middle-paygrade requirements.

Figure 9 is a hypothetical example of how future requirements might look. At the lower paygrades, people who mostly serve one term and leave might meet requirements for laborers. Skilled technical decision-makers would generally have to be brought in at higher paygrades to provide them with compensation that meets their civilian alternatives.

Figure 9. End of the manpower pyramid?



This assumes that pay will continue to be tied to rank, but a better alternative may be a mechanism to pay high-tech workers more without having to grant them higher ranks. These high-tech workers would then mostly stay in the middle ranks, rather than being forced out or promoted into supervisory ranks. Finally, senior leaders would continue to develop by promotion within the Navy.

Some likely features of the future workforce include:

- At the lower paygrades, a pool of laborers, many of whom serve only a single term
- Lateral entry into higher ranks or higher pay structures for skilled technicians with high-paying civilian employment opportunities
- Longer careers for skilled technicians without being promoted into supervisory ranks
- Changes in up-or-out policies to allow longer middle-grade careers
- Increases in compensation not tied to rank so that experienced technical workers don't leave the Navy

- Continued development of senior leaders by progression through the ranks.

Creating longer careers for skilled technicians is an issue that private-sector companies have also had to address. Many manufacturing firms use "parallel pay ladders" that allow engineers' pay to increase at rates that mirror those of managers' pay. That way, engineers can remain engineers and still be paid well and rewarded for tenure.

Another likely change involves Navy training. Future sailors will be generalists rather than specialists. They will need to know the theory underlying their fields, be technically literate, and be skilled analytical thinkers, decision-makers, and communicators. They may need to be cross-trained in several different areas. They will have less need for specific training tied to operating and maintaining Navy-specific equipment. All of these factors imply that future sailors will need more education and less training.

The services do much more of their own training than large civilian employers or other branches of the government. One reason for this has been that the military has had its own technology and practices, so that civilian training was not relevant. Two major trends may change the uniqueness of military training requirements, however. First, reduced manning, increased commonality of systems and subsystems, and technologies that require a "person-on-the-loop" all point toward a workforce with more generalists and fewer specialists. Second, as the military adopts more COTS technology, its workspaces will increasingly resemble those of businesses.

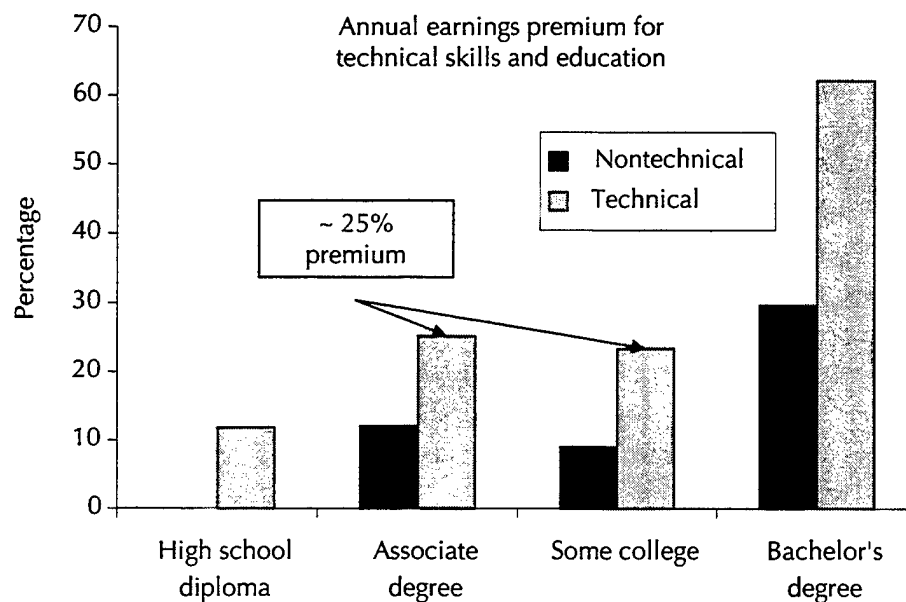
The need for education rather than training and the decreasing uniqueness of Navy training requirements both mean that the case for in-house training will be weakened in the future. Three alternatives to in-house training are partnerships with technical schools and community colleges, outsourcing, and hiring already trained workers.

## Compensating the future force

### Higher pay

The most obvious implication of the changes in Navy workforces that we have described is that a large portion of the enlisted force will require substantial pay increases. Figure 10 looks at private-sector earnings premiums for workers who have some postsecondary education and who work in technical fields relative to high school graduates in nontechnical jobs.<sup>2</sup>

Figure 10. Private-sector earnings premiums



<sup>2</sup> The data come from the U.S. Department of Labor's Current Population Survey (CPS). We pooled data from the March 1995 and March 1997 surveys and looked at annual earnings of full-time, nonagricultural workers between the ages of 21 and 40. We eliminated workers with graduate degrees and with full-time yearly earnings that were implausibly low or high. The results shown in figure 10 are for white males, a sample of 17,076. We controlled for age, region of the country the worker lives in, and whether the government employs the worker. Figure 10 shows the estimated marginal effects of skills on earnings; all earnings differences were statistically significant. Reference [17] explains this analysis in detail.

Our estimates indicate that, for workers with high school diplomas, working in a technical field increases earnings by an average of about 12 percent. The premium for technical workers with either some college or Associate degrees rises to 25 percent. Based on average earnings of \$28,500 for nontechnical workers with high school diplomas, the private-sector differential is about \$7,250.

We have already shown that Navy occupational differentials currently are well below the differentials paid in the private sector. Furthermore, these low pay differentials are associated with significant manning problems. These problems can only grow more severe as the Navy tries to attract people with higher levels of skills that are more generally applicable to private sector jobs and in very high demand.

Some people worry that there won't be enough people with the proper technological preparation available to fill future job demands. Our research indicates, however, that initiatives to increase preparedness of students for the future workforce will result in substantial increases in the supply of qualified applicants. The Navy, then, will have access to a larger pool of high school and post-secondary school graduates who will be increasingly technologically literate. The strong competition for these workers, however, means that the Navy must be prepared to pay for what it wants.

We foresee, then, two changes in compensation:

- Higher average pay levels because the average aptitude and technological sophistication of personnel will increase.
- Greater variation in pay levels among ratings because current pay differentials are so low that pay is too high in some ratings and too low in others.

### **More flexible compensation and career structures**

The Navy will have to be more flexible in offering higher salaries in certain fields, but it will need added flexibility in other areas, also. For example, allowing skilled technicians to have full careers without

moving into supervisory ranks will require changes to up-or-out policies and increases in pay not tied to increased rank.

In general, it may be necessary for the Navy to more flexibly define the relationships between skill, rank, and pay. Future platforms will require more highly skilled sailors, but not necessarily more high-ranking sailors. As we have seen, future sailors will have to know the underlying principles in their areas of expertise, be technically literate, and have strong problem-solving, decision-making, and communication skills. Because such skills will also be in high demand in the civilian sector, the future sailor will have to be well compensated.

Many of the future sailors' skills are general in nature, rather than particular to the Navy. This has two implications. First, general skills can be acquired through civilian education rather than through Navy-specific training. Second, someone could be highly skilled in this sense and know little about the Navy. Rank, on the other hand, is tied to acquiring Navy-specific knowledge and experience. With rank comes command authority, and command authority should only be given to those who have proven leadership ability.

With technological change altering the set of skills that sailors need, and with the proliferation of civilian technical postsecondary school training, it may become essential to provide higher pay to people who haven't been in the Navy long enough to have earned higher ranks.

In addition to pay increases for some ratings at the entry point, pay increases not tied to promotions may be required later in careers for Sailors who decide to follow a technical rather than management career track. Also, if the practice of exit and re-entry is allowed to facilitate access to a skilled, older population, flexibility in both career structures and compensation will again be necessary.

Just as the current compensation system isn't designed to allow flexible compensation differentials across occupations, it also doesn't support variation in career lengths across occupations. The military retirement system provides very little retention incentive early in careers because there is no vesting until 20 years. Once a Sailor has

passed a point where he or she thinks a 20-year career is likely, however, there is a very strong incentive to stay to exactly 20 years. On the other hand, it stands to reason that optimal career lengths vary by occupation because physical and mental demands, training investments, and civilian alternatives all differ. Again, the key would be increased flexibility to tailor compensation packages so that they can provide the correct force management tools for each occupation.

## Guidelines for compensation reform

The prescriptions for change that we offer in this paper are not meant to be exhaustive. Many areas have been covered thoroughly by other researchers and policy analysts, and we will only briefly highlight some of their work here. References [8, 9, and 20] provide more detail.

Several ideas exist for reforming the basic pay tables. Reference [6] argues that, for the prospect of promotion to induce effective work, the rewards due to promotion must be large enough relative to longevity increases. Also, promotion rewards generally must get larger at higher ranks. The authors conclude that pay tables should be changed so that inter-rank differentials are larger than intra-rank and inter-rank differentials increase with rank.

Other criticisms of pay tables relate to relative earnings at different enlisted ranks and to the relationship between the enlisted and officer pay tables. The 9<sup>th</sup> QRMC is investigating whether pay tables should be changed so that compensation is increased at paygrades E5 through E9 and senior enlisted pay is increased relative to junior officer pay.

The military retirement benefit is often criticized because it is much different from any other private or government pension. Typical retirement plans have less generous benefits, have earlier and more gradual vesting, have defined contribution rather than defined benefit pensions, and don't pay any benefits until a fixed retirement age.

Another criticism is that having a "one-size-fits-all" retirement system exacerbates the difficulty of tailoring compensation to suit different occupations. Reference [7] argues for replacing the military's immediate annuities for people who leave with 20 or more years of service with two things:

- An old-age annuity comparable to private-sector pension plans with vesting starting around YOS 10 and payments starting at age 60.
- Cash separation payments to those who separate after some minimum period of service. These payments would be a flexible force management tool with payment levels and eligibility criteria manipulated as needed to control inventories and experience distributions. Separation payments could be made earlier in occupations requiring youth and vigor and later in occupations with higher payoffs to experience. Separation payments could also be made larger for people whose military skills aren't easily transferable to the private sector.

Basic pay would then be adjusted to keep retention at desirable levels.

The relatively large benefits paid to servicemembers are also open to question. On one hand, some benefits further compensation goals, such as increased retention, or support military-specific features, such as internal job ladders or providing for subsistence. On the other hand, some benefits may target too small a group or run counter to other strategic compensation goals. Benefits cannot generally be targeted to support such goals as attracting and retaining critical skills or encouraging the best people to stay.

## **Move toward two flexible pay elements**

Regardless of whether some of the reforms discussed above are adopted, we argue for retaining many of the features of the current military compensation system while moving as much pay as feasible into two flexible market-based incentive pays. The first of these pay elements would provide distribution incentives to allow the Navy to better meet the goal of allocating people across jobs. The second pay element would provide occupational differentials to facilitate the goal of attracting and retaining people in fields where their civilian counterparts are highly paid.

Adding the distribution incentive pay and occupation pay should only increase total compensation costs to the extent that average pay is too low to attract recruits with the required average aptitudes. Many of the current special and incentive pays could be collapsed into these two elements and used more effectively by targeting pay to where market signals indicate the problems are. Also, we argue below that flexible incentive pay and voluntary assignments should be less costly than the current involuntary distribution system.

Rather than tying pay changes to cost-of-living indices or the "pay-gap," both the distribution incentive and the occupation pay would be adjusted based on market signals. For distribution pay, measures of difficulty in filling billets by location or type of duty would be monitored and pays adjusted when problems pass some threshold level. For occupation pay, occupation-specific recruiting and retention patterns would provide the tests.

The basic pay tables would be maintained to continue to meet the pay equity goal. Also, the allowance system could be kept to meet the goal of providing subsistence for servicemembers and their families. Perhaps over time, as the success of new pay elements is proved, relatively less of new pay increases would be devoted to basic pay and allowances and relatively more to the flexible, market-based pays. This would allow a gradual, tested transition. Our suggestions should be understood as an ideal to move toward, not an initiative to adopt tomorrow.

## **The case for flexibility**

The main reason the Navy needs more flexibility in its compensation system is that, as it moves forward in a dynamic economy with rapid technological change, it will need to adjust rapidly to changing conditions. The Navy isn't as isolated from outside labor markets as it once was because less of its technology is Navy-specific and because it increasingly requires Sailors with general skills that are in high demand in the private sector.

The most efficient way to introduce this flexibility would be to move toward a market-based system of incentive pays and voluntary

assignments. By market based, we mean that pays are adjusted in response to shortages—whether in a location, a type of assignment, or a skill area. If pays are adjusted to relieve shortages, it follows that Sailors must be free to respond to these incentives; in other words, assignments must become more voluntary.

Market-based pays and voluntary assignments are a fairly radical departure from the current system. Here we will first argue that market-based pays are better because they introduce the advantages of a freely functioning price system. Second, we will propose a way for the Navy to move gradually toward this ideal without a major overhaul of military compensation.

## **Economics 101: The price system**

The price mechanism in the market performs several functions. A freely functioning price system allocates goods to those consumers who are most willing and able to pay for them. It serves as a signal of the relative scarcity of different goods, and, in its role as a market signal, the price ensures that the production of a good (its supply) corresponds with the consumers' desire (demand) for the good. That is, the production and consumption decisions by millions of anonymous self-interested agents are coordinated by the market price mechanism. A key component is the flexibility of the price mechanism to adjust quickly and fully to changing market conditions. It is this flexibility that makes the unfettered market system "efficient."

## **Consequences of inflexible prices**

Because the price system allocates goods to those who are willing and able to purchase them, outcomes sometimes disadvantage people with few economic resources. In response to these inequities, governments often interfere in the market by imposing inflexible prices in the market. These prices are set above (price floors) or below (price ceilings) the market price that equates market demand and supply.

### **Rent control**

For example, rather than adopting general income redistribution programs or means-tested housing vouchers, many local/state governments impose rent controls to provide low-cost housing in areas where housing costs are too high for less wealthy individuals. These government-imposed maximum rents on apartments or houses are price ceilings that must be set below the equilibrium rental price to be effective.

Rent controls, however, often have unintended consequences. The primary effect of any type of price ceiling is a shortage of the good: Quantity demanded exceeds the quantity supplied. Shortages of rental housing can take two forms. The first is the actual shortage of housing that occurs at a price where the quantity desired by renters exceeds the quantity supplied by potential landlords. This shortage is expected, particularly in the long term. Although the existing units remain, the private construction of new rental units is reduced as developers and mortgage lenders react to the reduced profitability caused by the lower rent.

In addition, current landlords might be expected to reduce the quality of housing (in effect, creating a shortage of "livable" rental units), as landlords maintain profit margins in response to lower controlled rents. Furthermore, there is no guarantee that rent controls will improve the inequities caused by an unfettered efficient market system. After all, rent controls are typically not means-tested and many upper-income individuals will also benefit from the lower rents.

### **Minimum wage**

Resource markets behave like markets for goods and services in that they are also guided by the price mechanism. In the labor market, the wage determines the supply of labor to the market and it will also determine the employers' demand for labor. The equilibrium wage rate equates the quantity demanded of labor with the quantity supplied. Impediments to this wage mechanism will likely create inefficiencies in the labor market. One obvious example of price

interference in the labor market to correct market inequities is the government's imposition of a minimum wage.

The minimum wage is a floor on the wage that is generally set above the equilibrium market wage for the lowest wage, least skilled workers. It has been estimated that about 4 million workers earn the minimum wage, which is obviously intended to improve the situation of these workers. However, the primary effect of any type of price floor is a surplus of the good: Quantity supplied exceeds the quantity demanded. Consequently, the overall impact of the minimum wage might not be to help all low skilled workers. Although some workers will receive higher pay, others might lose their jobs as employers substitute higher skilled workers or even capital equipment for the now higher wage workers.

#### **Teacher salaries**

The single-salary schedule is another example of wage inflexibility in the labor market. Under this schedule, workers in an industry are paid according to a common schedule. Salary differences among individuals depend on observable attributes, such as seniority, but not on the type of job. Because workers in some job categories within an industry are relatively scarce in the overall market, this inflexible salary schedule creates shortages for certain job categories.

For example, in most U.S. public school markets, teachers are paid on a single-salary schedule. Pay differences are based on years of teaching experience, education units (e.g., Master's degree), and multiple jobs (e.g., teaching plus coaching or serving as club and extracurricular activity advisor). Salaries in this market are not based on the teacher's field of education. Consequently, there are teacher shortages in the math, science, and computer fields where significant outside opportunities (i.e., higher salaries) are available.

Findings from a recent survey of teacher salary trends by the American Federation of Teachers indicate a "considerable shortage" of math teachers and "some shortage" of physical science, life science, and computer teachers. It is not surprising that the same survey found that engineers and computer systems analysts—in the

middle of the income range for all engineers or computer analysts—earned about 1.6 times the average teacher salary in 1998.

## **Allowing prices to move**

If price controls are removed in a market and allowed to adjust quickly and fully to changing market conditions, the market is expected to become more efficient. Several recent examples of the lifting of price controls have been observed in markets that were previously regulated by the government. Regulation typically takes the form of government restrictions over the firm's price and/or output decisions as well as entry into and exit from the market.

### **Railroad and trucking deregulation**

The U.S. railroad and trucking industries represent one case of deregulation. Railroads were regulated beginning in the late 1800s, probably as a way to keep prices stable and firms profitable. One explanation for the regulation of trucking was that because of its close substitutability with railroads, regulators were unable to achieve a particular outcome for the railroads. Therefore, trucking regulation allowed closer regulation of the railroads. The regulatory agency set maximum and minimum rates in both the railroad and trucking industries. As a result, regulation did not allow flexibility in trucking and rail rates. Inflexibility led to cases in which rates were not optimally set, so that freight went by railroad in markets where trucking rates were set too high and it went by trucks when railroad rates were too high.

In 1980, the U.S. Congress deregulated the railroad and trucking industries. The impact of the legislation was to improve the profitability in the railroad industry because it gave rail firms the ability to raise rates when demand is strong and reduce them when demand is weak. Furthermore, efficiency was improved as market forces determined the optimal use of railroads and trucks for transportation.

### **IRS distribution incentives**

Shortages can also develop under a single-salary schedule if positions in undesirable geographical locations are difficult to fill. The Internal Revenue Service (IRS) is designing a program to address manning shortfalls with the provision of financial incentives. The program includes collecting data to determine individual preferences and positions (either locations or types of jobs) with chronic manning problems. The IRS plans to offer lump-sum incentive payments of up to 25 percent of base salary. The IRS, unlike the military, cannot order individuals to accept assignments, so the pressures to design appropriate incentives are more immediate.

### **Parallels to Navy compensation**

Although some of the standard economic examples may seem to have little to do with Navy compensation, there are several direct parallels:

- A rent control sets the price below the market level, just as the lack of sufficient occupational and distribution incentives mean that wages are below market levels for some occupations, locations, and types of jobs in the Navy.
  - Distribution incentives set too low result in the need to “order” people into jobs. We will discuss the negative consequences of this, from having to pay higher than necessary compensation costs, to not getting the right person in the right job, to paying unexpected costs in terms of retention. Also, just as rent control leads to inefficient resource allocation, lack of market-based distribution incentives means the Navy doesn’t face explicitly the true cost of some job locations and working conditions.
  - Occupational differentials below market rates result in shortages in these occupations. Just as in rent control, another possible outcome is a quality adjustment, so that occupations are filled but not with the highest quality people.

- The single-salary schedule for teachers and resulting shortages of math and science teachers represent an exact analogy to manning problems in high-tech Navy ratings.
- A minimum wage is set above the market-clearing wage. In the Navy, equity in pay across ratings may result in surpluses of workers in lower-skill, lower-productivity ratings (more applicants than are needed for mess cooking and clerical positions). Also, if resource sponsors must pay more for these billets than the value of their product, not enough low-paying billets will be purchased. This could partly explain complaints that resource sponsors buy so few GenDet and MS billets that other Sailors must work details in these departments.

### **Compensating wage differentials**

The premise behind an All-Volunteer Force is that the military is able to obtain the recruits with the lowest opportunity cost and those most willing to serve. While enlistment is indeed voluntary, individuals are often assigned to duty stations involuntarily and many billets are chronically hard to fill.

The idea behind distribution incentive pay is to encourage voluntary assignment to hard-to-fill billets, offering compensation as an incentive to those who volunteer. Economists have argued that individual and employer preferences are crucial to a successful matching process [21, 22]. Incorporating preferences into the decision-making process is the best way to ensure that individuals are satisfied with their placement, and that the employers are satisfied with their new employees.

If preferences are not taken into account, people who are not satisfied with the outcome have less incentive to perform well or continue the relationship. In the Navy's case, assignments that have not addressed the desires of the enlisted will likely lead to job dissatisfaction and, ultimately, retention problems.

Reference [21] shows that provision of financial incentives is necessary to compensate individuals for accepting positions that are not desirable. Furthermore, the author demonstrates that those who

strongly prefer (or are least averse to) a particular position can be hired at lower wages than those who do not desire (or are more averse to) the position. This allows the employer to obtain an employee for a position at the lowest cost.

### **Improved economic signals**

A market-clearing price provides optimal signals for resource allocation because it means that the cost to the supplier of producing one more unit exactly equals the value to the buyer of consuming one more unit. Moving toward a market-based pay system and a more voluntary assignment system, then, will improve economic signals and resource allocation in the Navy.

A voluntary system enables one to measure the true cost of having a billet in a particular location. Under an involuntary system, the Navy still pays Sailors for having to serve in a billet, but it pays them indirectly, normally at the reenlistment point. This indirect cost may be mostly hidden from the resource sponsors who buy billets in these locations. Under a voluntary, direct payment system, the true cost of filling billets in unpopular and difficult-to-fill locations or with unattractive working conditions will be much clearer. Similarly, market-based occupational differentials would allow better decisions to be made about how many billets requiring different skills should be bought.

A second advantage of a voluntary system is that supply and demand data provide a very clear signal of whether the pay is too much or too little. Currently, the Navy has a plethora of special pays and allowances, none of which has a clear measure of effectiveness. We have significant problems within the Navy, not to mention DoD, the Office of Management and Budget (OMB), and Congress, justifying and setting these pays. It follows, though, that having flexible pays will do little good if we do not have good criteria for setting or changing those pays.

## Cost-effective retention

Another benefit of a market-based pay system is that it will allow the same levels of retention to be purchased at a lower cost. Even if the immediate aim of a distribution pay incentive is to allocate people across jobs efficiently, it will also have a retention effect.

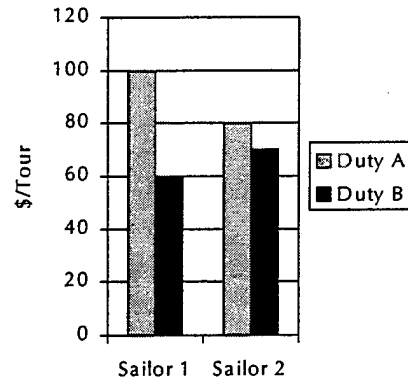
Under the current AVF environment, the Sailor makes voluntary decisions to enter and to stay in or leave the Navy. Distribution decisions are more or less involuntary, subject to the needs of the Navy coinciding with the Sailor's preferences. However, every involuntary assignment decision will eventually influence the Sailor's retention decision.

Some look at this involuntary system as a necessary evil; they believe that a voluntary system is either unachievable or too expensive. In reality, the Navy must pay Sailors one way or another—and, if it doesn't compensate them adequately for their duty, it must pay a potentially greater price in recruiting and training cost after they leave.

Figure 11 provides a hypothetical example of how a voluntary rotation system ("self-selection") can meet both the Navy's manning needs and the Sailor's preferences more cost-effectively. This simplified, illustrative example has two Sailors and two duty stations. The chart on the left shows the additional cost/month (in addition to all current pays/benefits) required to get each Sailor to volunteer for duty A and B. As we can see, Duty A is regarded as more difficult/distasteful for both Sailors than Duty B. However, while the order of their preferences is the same, their "price" for each location is not.

Under the current "share the pain" system (where incentives are not adequate to get either Sailor to volunteer for the "bad" duty), the Navy would rotate both Sailors through Duty A and B. To keep these Sailors in the Navy, we would have to pay each Sailor about \$80/tour. Because there is no distribution incentive pay, this additional cost must be present in other compensation, such as bonuses or basic pay, or else both Sailors would not be retained.

Figure 11. Self-selection and cost



**Cost of "share the pain" approach:**

Sailor 1:  $\$100 + \$60 = \$160$  or  $\$80/\text{tour}$

Sailor 2:  $\$80 + \$70 = \$150$  or  $\$75/\text{tour}$

Total:  $\$155$  (higher PCS + "risk premium")

**Cost of "self-selection" approach:**

Sailor 1: Stays in Duty B =  $\$60/\text{tour}$

Sailor 2: Stays in Duty A =  $\$80/\text{tour}$

Total:  $\$140$  (lower PCS + "risk premium")

Under the self-selection approach, Sailors would sort themselves into jobs based on their relative preferences—with Sailor 1 being low bidder for Duty B and Sailor 2 for Duty A. In addition to the cost/tour of the additional compensation required for these duty stations, Sailors going voluntarily would generally stay longer. Therefore, there is a decreased cost of PCS and other factors inherent in geographic instability. Also, there is likely a "risk premium" that the Navy must pay because of the uncertainty that the Sailor feels about his or her future duty under an involuntary assignment system. The total cost of retaining and assigning Sailors will be less if they are in control of their duty choices.

## Distribution Incentive Pay demonstration proposal

The current Navy distribution system relies on compulsory assignments and equity-based pay. That is, Sailors are given limited choices regarding location and type of job subject to the needs of the service. They are often ordered into jobs that don't suit their preferences. The compensation system then offers a plethora of special pays to "restore equity." For example, submarine duty is considered to be more arduous than working in a schoolhouse, so extra sub pay is given to move Sailors assigned to boats back toward equality with those in schoolhouses.

Another mechanism used to keep everyone more or less happy is to rotate people fairly quickly among good and bad assignments in order to share the pain. When neither the patchwork of special pays nor sharing the pain is enough to compensate Sailors for the disamenities of their jobs, the Navy eventually pays the price in lower retention or higher SRBs.

Contrast the current situation to a distribution system based on voluntary assignments and flexible market-based pay. In this system, people would choose their own jobs, and the needs of the service would be satisfied by adjusting flexible distribution incentives until there are enough qualified volunteers to fill every job. As a result, pay differentials would reflect what the market demands in order to fill different jobs, and the owners of the jobs could make informed resource allocation decisions based on the true cost of labor. Also, there would be less need to shorten assignments to share pain, meaning PCS costs would be lower. A remaining vestige of the conscription system would disappear, and the military wouldn't have to pay a premium to young people who object to seemingly arbitrary authority.

The ideal just described is a far reach from the current system. We believe that the benefits are compelling enough, however, that the Navy should begin gradual movement toward a market-based distribution incentive pay. A current ULB initiative would provide a first step.

## **The ULB proposal**

The Distribution Incentive Pay proposal was in the FY02 ULB, but has been deferred to FY03. It provides for up to \$500 per month in distribution pay to encourage Sailors to volunteer for hard-to-fill billets. The pay would be flexible, with adjustments to be made based on supply and demand criteria.

The initial intent is to provide a monetary incentive to substitute for the nonmonetary incentives currently being offered for Type 3 (sea duty credit) and Type 5 (neutral duty credit) duty in the Navy. These nonmonetary incentives have had negative unintended consequences of making it harder to fill actual sea duty billets. It would also be an alternative to some overseas tax incentives currently being considered and to the credit system being designed by the Distribution Reengineering Action Team (DRAT).

In the longer term, Distribution Incentive (Distro) Pay could be expanded to other billets and form the shore counterpart to the sea pay reform initiative proposed for FY01. The Distro Pay initiative has been proposed as a demonstration project, or a test, for Navy only. The intent is to use this test to investigate several issues that must be resolved before Distro Pay could be adopted on a wider scale.

## **Expected benefits**

We have already outlined many of the expected benefits of Distro Pay in the general context of flexible, market-based pays. By producing a market-clearing price, the pay would relieve surpluses and shortages or quality adjustments. It would provide improved economic signals and therefore ensure better decisions regarding how many billets are bought, as well as what types, in what locations, and with what working conditions. Because people will volunteer first who are least averse to a certain job, Distro Pay will lower average premiums for hard-to-fill jobs, as well as risk premiums demanded by people to make up for uncertainty regarding their future.

More specific benefits of Distro Pay include the following:

- Distro Pay will enable the Navy to eliminate or reduce the use of nonmonetary incentives that have tied up the distribution process—particularly, reducing the Sailors available for sea duty. As a result, it will improve manning at sea.
- Volunteers will be more likely to be willing to stay at the same job longer, rather than requiring frequent rotations to share the pain. This will increase crew stability and cohesion leading to increased Sailor productivity.
- The increased assignment stability will make homebasing easier, increase family stability, and increase Sailor satisfaction.
- PCS spending will fall, as will costs for transients and retraining.
- Finally, the flexibility that Distro Pay offers to address unforeseen problems on short notice makes it extremely valuable.

## Management issues

A number of practical, management issues will have to be worked out in making the transition to a more voluntary distribution system using Distro Pay and the new Career Sea Pay:

- Adapting to a voluntary assignment system: allowing supply and demand to dictate our incentives. There will be a tendency to fall back on ordering people into gapped billets if pay adjustments and supply responses take too long.
- What will be the magnitude of voluntary responses to distribution incentive pay? Because the Navy hasn't had a voluntary assignment system, it has very little information on how much pay it takes to encourage people to take different types of jobs. Part of the test project will be to try to estimate pay elasticities or responsiveness within the distribution system.

- What mechanism should be used to set pay levels in a voluntary system?
  - A centralized approach is the most likely near-term approach. This would continue to have detailers matching Sailors to prospective billets. Data would be collected from detailers on supply and demand (“fill rates”) for billets and pay rates adjusted accordingly.
  - A more direct, decentralized process resembling the private-sector labor market might eventually be developed. Individuals would negotiate with the potential duty stations, and those commands would have authority (and money) to offer Distro pay levels to fill the jobs. Something like this could be included in the plans for distribution reengineering with intelligent agents for Sailors and commands haggling over incentive pay levels as they close assignment deals.
- Other issues in adjusting rates include the following:
  - How often should rates be adjusted?
  - Should rates be adjusted by location or by billet within each location?
  - Should a person serving in a billet receive the same rate, even if rates have changed during his/her tenure?

## Long-term evolutionary change

Finally, depending on the success of the demonstration project, a number of long-term paths are possible. The ability to sustain a voluntary assignment system promotes a long-term vision that may greatly simplify the compensation system of the future. For example, over time, Distro pay could merge with other special pays and incentives, with this new pay level dependent on the supply and demand of people willing to serve in particular jobs. One might conceive of a compensation system composed of basic pay and allowances, plus perhaps one flexible distribution pay (determined at the rotation date) and another flexible retention incentive

(determined at the reenlistment or decision point). Both would be driven by supply and demand criteria.

Again, this is an evolutionary process that would start with the test of Distro Pay and the new Career Sea Pay and is dependent on success at each stage of the process.

## Conclusions and recommendations

Although the Navy's compensation system does an admirable job of meeting some of its own institutional goals, it lacks the tools to operate a more voluntary, stable assignment system. The result is many involuntary assignments and dissatisfied Sailors who eventually leave the Navy when given an opportunity. To minimize the dissatisfaction, we move people often and cause increased disruption (not to mention cost) for Sailors and their families. There is evidence that the Navy sees the advantages of a voluntary system because it goes to great lengths to achieve it by using very costly nonmonetary measures or imperfectly targeted pay incentives. These incentives, however, are not flexible enough or valuable enough to attain a voluntary system.

Distro Pay coupled with new Career Sea Pay reform initiative could go far toward providing that flexible, market-based system of incentives. The Navy has an opportunity in the Distribution Incentive Pay demonstration proposal to test the concept and get some experience with it. If this is successful, the Navy can move forward to a more simplified and cost-effective assignment and compensation system based on a truly *All Volunteer Force*.

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## List of figures

[1] What should a compensation system do? .....	4
[2] E4 to E6 bodies relative to billets authorized by rating, FY 1998 .....	14
[3] Median annual earnings in comparable civilian occupations .....	15
[4] Incentive structure may have unintended consequences .....	21
[5] Anticipated changes in 21 <sup>st</sup> century .....	23
[6] Future Sailor's qualifications .....	25
[7] From pyramids to pillars .....	27
[8] Fewer people stop education at high school .....	29
[9] End of the manpower pyramid? .....	31
[10] Private-sector earnings premiums .....	33
[11] Self-selection and cost .....	48

# Distribution list

Research Memorandum D0002082.A2

ASSTSECNAV M&RA Washington, DC

Attn: PDASN M&RA

DASN Manpower

BUPERS Millington, TN

Attn: PERS-1

PERS-4

PERS-6

USNA Annapolis, MD

NAVPGSCOL Monterey, CA

NAVWARCOL Newport, RI

## OPNAV

N1

N1B

N12

N12B

N120

N122

N125

N13

N13T

N130

N131

N132

N4

N4B

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N81