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March 2001

# The CNO Briefings:

## Recruiting Issues
## Navy Enlisted Education Policy
## Quantity and Quality of Attrition
## Compensation Strategy for the Future Force

Workforce, Education and Training Team
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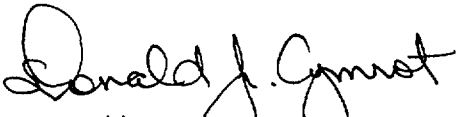

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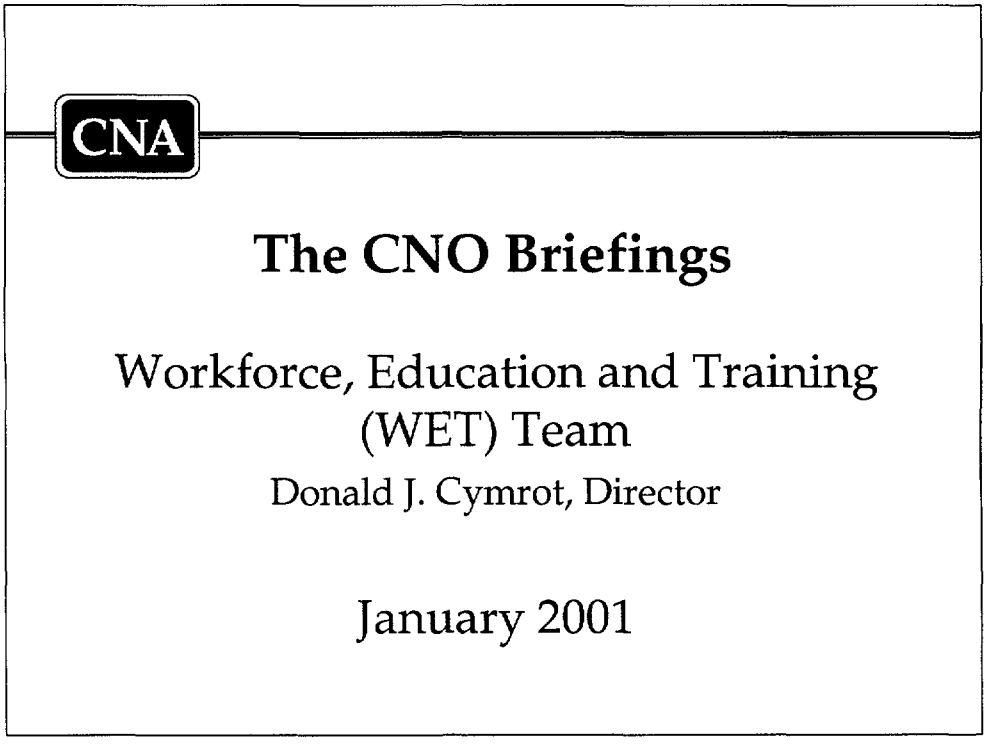


On January 2, 2001, Chief of Naval Operations (CNO) Admiral Vernon Clark visited the Center for Naval Analyses (CNA) to hear a series of briefings on contemporary issues of interest to the Navy. Research Staff members of the Workforce, Education and Training (WET) Team presented three of these briefings on Recruiting Issues, Navy Enlisted Education Policy, and the Quality and Quantity of Attrition. During this session, Admiral Clark received a copy of a paper on Compensation Strategy; shortly thereafter, he requested a follow-up briefing on this issue. Each of these briefings synthesizes a body of work performed at CNA over the last few years. This project was a collaborative effort by the entire WET team. See the appendix for a team roster.

This document provides annotation of these four briefings.

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# Contents

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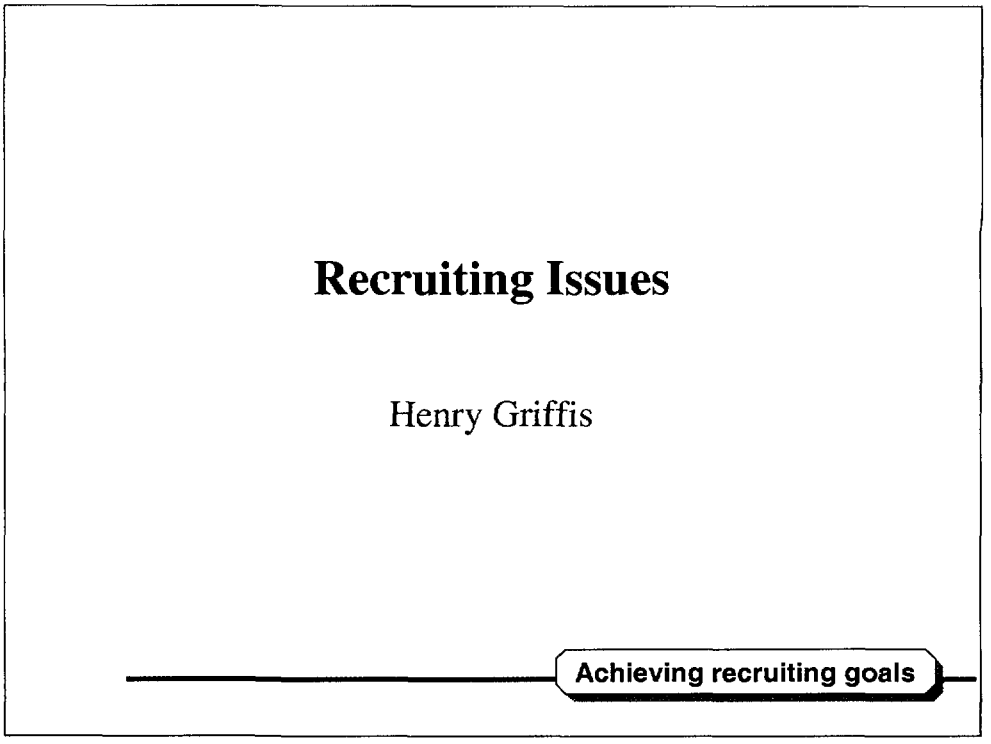
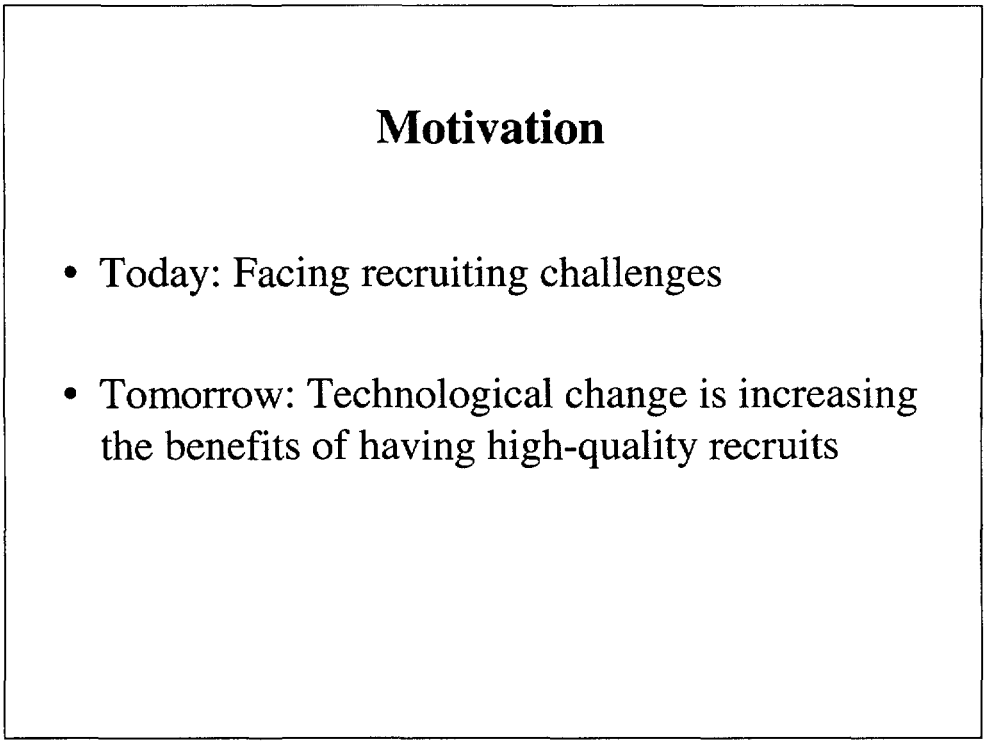



Enlisted recruiting for the last few years has been a major area of concern for the Navy. This briefing examines ways the Navy can improve the efficiency of its recruiting efforts, expand more effectively to nontraditional markets, and reduce its accession goals.

Because this annotated briefing summarizes work from several ongoing and recently completed CNA projects, it represents portions of the work of Jerry Cox, Heidi Golding, Peggy Golfin, Henry Griffis, Michael Hansen, Amanda Kraus, Carol Moore, and David Nickerson.




Recruiting must be thought of as both a short- and a long-term concern for the Navy. In the short term, recruiting challenges have made it more difficult for the Navy to make overall accession goals and, even when meeting the overall accession goal, more difficult to bring in the required mix of people. In the long term, technological change will create a situation in which more of the Navy's enlisted force will need to be of high quality (as measured by test scores and educational attainment), which suggests additional challenges for recruiting.

Solving short-term and long-term concerns involves a tradeoff. Certain actions taken to help meet the here-and-now recruiting goal may not be yielding the quality of recruits the Navy will need for the future. Likewise, because certain investments needed to build the future quality of recruits don't contribute to making the here-and-now goals, they are not funded in an environment that requires resources to be diverted to short-term challenges.

Of course, not all actions help recruiting in the short term at the expense of the long-term need for higher quality. This briefing highlights several recruiting strategies that align well with the long-term strategic objective of a higher quality force. It also highlights several that may help the Navy meet near-term objectives but do not align well with the long-range plan.

## Bottom Line

- With current limits on summer surge, recruiting not funded to reach high-quality market
- It's not just money—changes in the culture/ philosophy of recruiting are necessary
- Better retention substitutes for accessions
- Better retention also has readiness payoff, but can't fund it by recruiting/training savings alone

At this point, let's preview this briefing's conclusions. First, constraints on the size of the summer surge of accessions are not aligned with the Navy's long-term strategy of building a higher quality force. Because of the high school graduation cycle, it is easier to recruit high-quality high school seniors for summer shipping than to recruit workforce recruits later in the year. To the degree that constraints are placed on the number of recruits who can ship in the summer, the Navy is forced into the off-peak workforce market in which high-quality recruits are much less available.

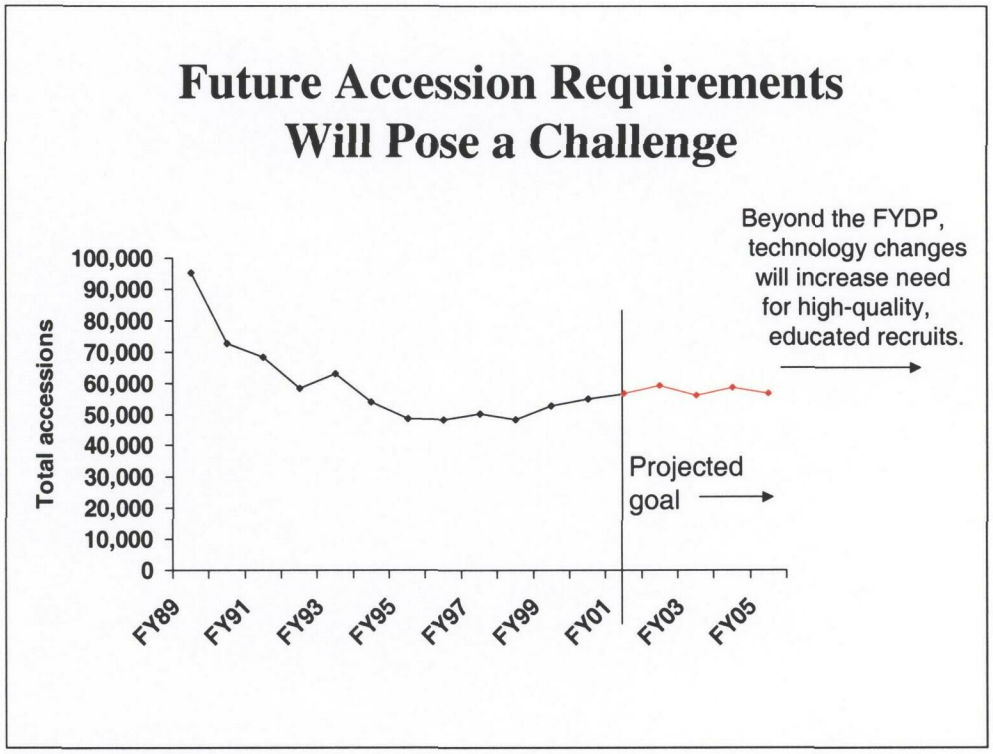
Second, investments may be necessary to expand recruiting's reach to nontraditional markets, such as the community college market. These investments will come at a cost, and they will be endangered if they are interpreted as diverting resources needed to meet current challenges rather than as investing in the future. Putting more dollars toward reaching new recruiting markets is not the answer in and of itself. Changes in the culture and philosophy of recruiting must take place before such investments can pay off.

Third, pursuing a long-term strategy of substituting better retention for accessions alleviates current pressures on recruiting and is also aligned with the Navy's long-term strategy of building a higher quality force. We explored the costs associated with using reenlistment bonuses to generate the higher retention, and found that the seniority and reenlistment bonus costs associated with the higher retention exceed the recruiting and training savings from the resulting lower accessions. We found, however, that increasing the retention is still cost-effective, at least for the more technical ratings, if one factors in a measure of the readiness benefit of the higher seniority.

## Outline

- Describing the recruiting environment
- Improving recruiting efficiency
- Expanding the market
- Reducing accession requirements

The rest of this briefing has four sections. First, we set the scene a little more on the enlisted recruiting environment, looking at the recent past as well as projections for the future. Second, we examine ways to recruit more efficiently within the markets in which the Navy is already active. This section includes our analysis of the effects of the current constraints on summer surge. Third, we discuss ways the Navy can expand its efforts to potential recruits in portions of the market not now being tapped. This section includes our analysis of recent programs that have expanded the number of low-quality recruits the Navy is bringing in as well as our analysis of which recruitment incentives are relatively better for expanding the market on the high-quality side. Last, we discuss how higher retention can be used to reduce accession requirements.




The drawdown in defense forces in the 1990s caused the Navy's accessions to drop considerably from the levels of the 1980s. Recruiting also became more difficult in the 1990s. This slide looks at whether those difficulties will be alleviated by reductions in future accession requirements.

First, let's examine whether the Navy's short-term recruiting difficulties will be alleviated by a future drop in accession requirements. Navy projections across the FYDP suggest that the answer is no. If anything, accession requirements will be higher than what the Navy has been able to achieve over the last 5 years, during which time the Navy has struggled to make its begin-year recruiting goals. In FY96 and FY97 those problems were masked by large, within-year cuts in the recruiting goal designed to deal with underfunding of the MPN account. This had the effect of making the Navy finish the year below its planned endstrength. This worked while the Navy was drawing down, but as it started pulling out of the drawdown, the underlying challenges with recruiting became more visible. In FY98, because of undermanning concerns, Congress held the Navy to an endstrength floor, which did not allow it to make within-year cuts. The Navy missed its recruiting goal by about 7,000 accessions in FY98. In FY99 and FY00, the Navy made its overall recruiting goal but was unable to bring in the required mix of people.

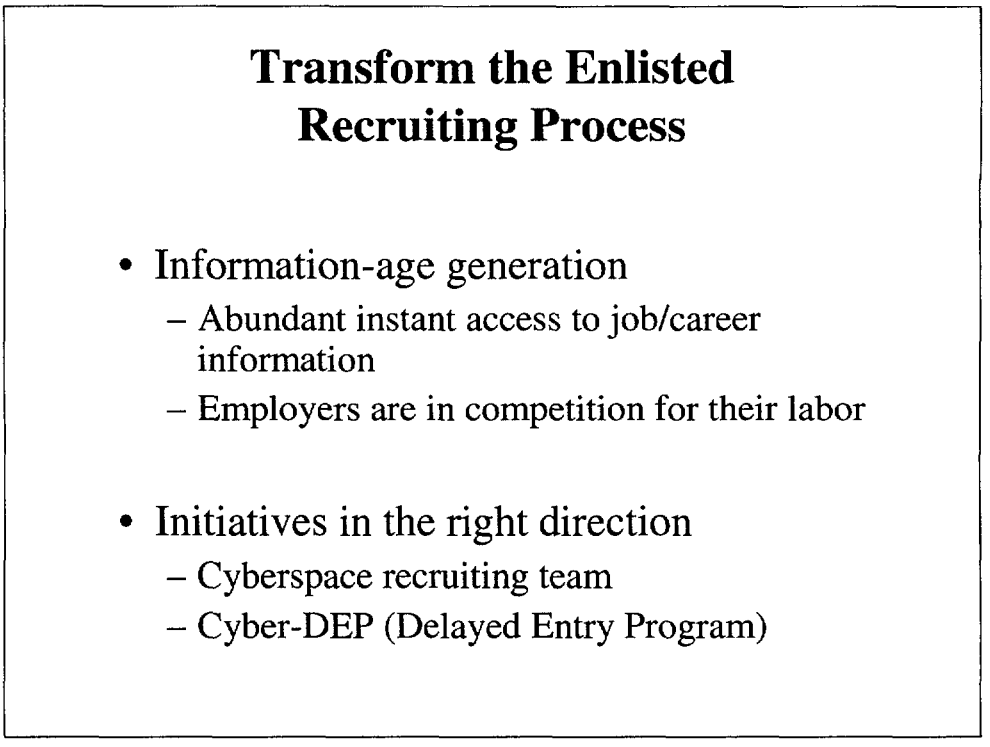
Now let's consider what will happen to accession requirements beyond the FYDP. Several studies have focused on how the introduction of new platforms—such as DD-21, LPD-17, and the future carrier—and how the introduction of smart-ship technology will affect requirements. The studies agree that the introduction of new technology will increase the requirement for Sailors who have better decision-making skills, the kind of skills developed through additional education [1]. Trying to bring relatively more of this type of recruit into the Navy will pose a long-term challenge to Navy recruiting.


How much did the enlisted recruiting environment worsen across the 1990s? In rough terms, recruiting has become about twice as difficult over the past 10 years. First consider the downward sloping line, which shows Navy average production per recruiter per month (PPR). PPR has dropped from about 2 recruits per recruiter per month 10 years ago to about 1 recruit per month currently. The two upward sloping lines show a similar trend for cost per recruit, albeit over a shorter span of time. Navy Recruiting Command provided us with 7 years of data showing the Navy's cost trend per recruit and 5 years of data showing the cost trend across all of DOD combined. All four services have seen a similar trend through the 1990s.

Why has recruiting gotten so much more difficult across the 1990s? First and foremost, one has to consider the economy, which strengthened considerably in the 1990s. By the end of the decade, the U.S. unemployment rate had reached its lowest level in more than 30 years. This created a much more challenging recruiting environment. But other factors have been at play. The size of cohorts reaching 18 years of age shrank during most of the 1990s. The percentage of high school graduates going on to college increased, shrinking the Navy's traditional recruiting market. And the veteran share of the population shrank, reducing a factor previously shown to assist recruiting efforts.

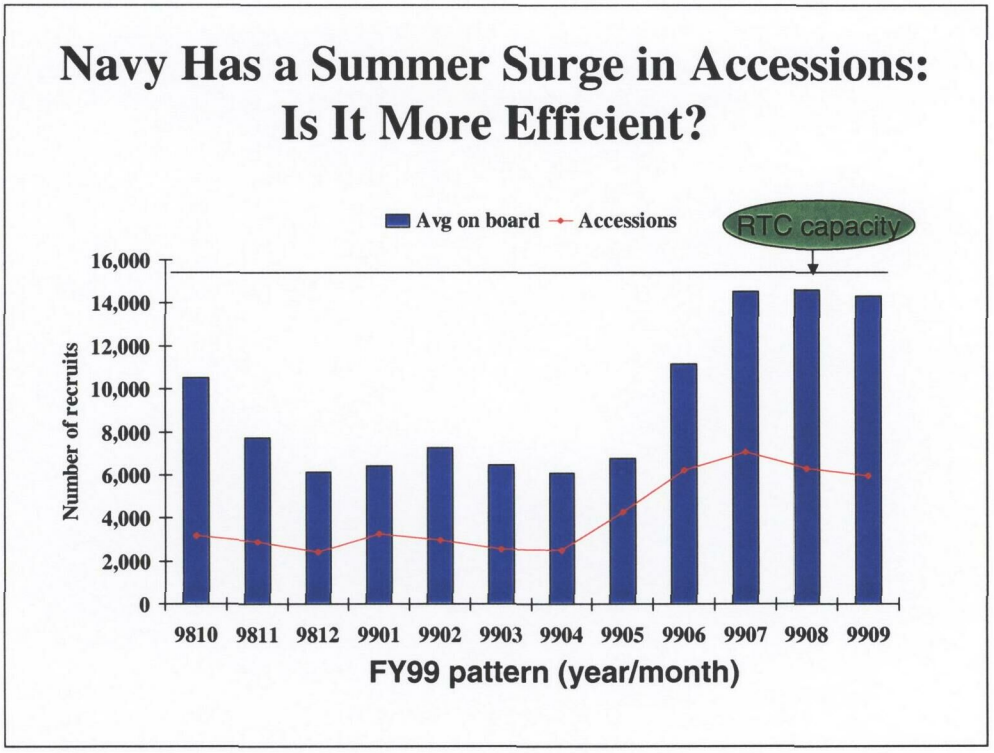
# Improving Recruiting Efficiency

This section examines ways for the Navy to improve its enlisted recruiting efficiency.



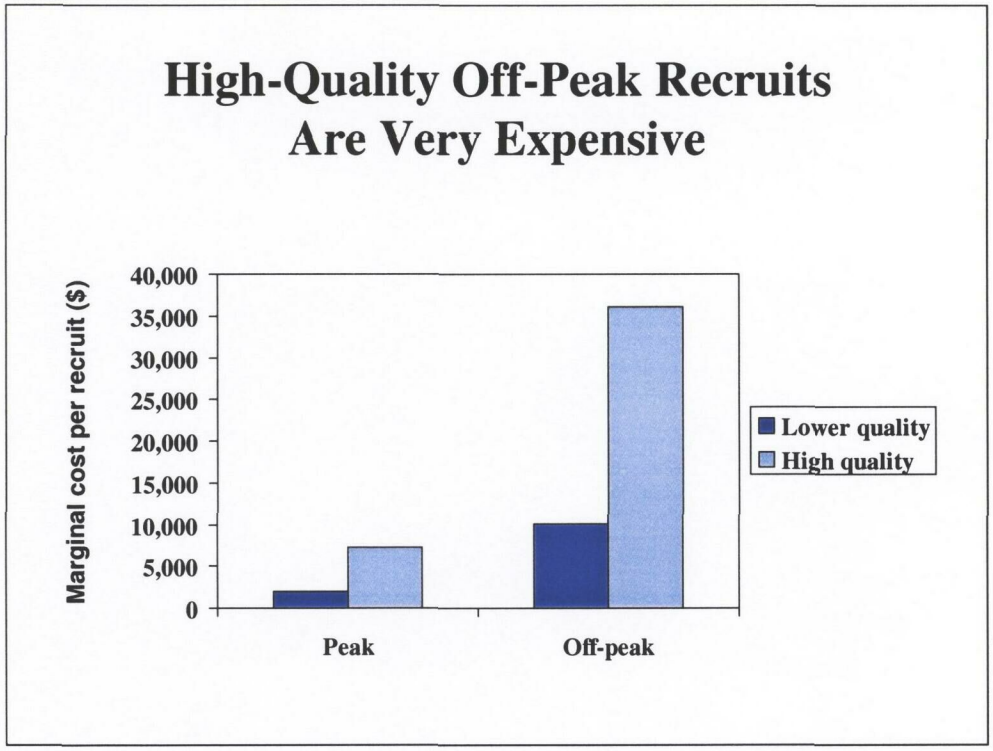

One way to improve recruiting efficiency is to transform the recruiting process in ways that exploit changing trends in how youth gather career information and conduct job searches. Today's youth are much more likely than past cohorts to use the internet as part of their job searches. Employers who position themselves to take advantage of this trend will have an immediate advantage when it comes to competing for these potential employees.

Through a couple of recent projects, CNA has helped the Navy take some steps in this direction, but these efforts have been of a relatively small scale so far. Several years ago, CNA assisted Navy Recruiting Command in placing advertising on internet job posting sites, which led to the creation of a small cyberspace recruiting team within CNRC [2]. And, just in the last year, CNA created for CNRC a "cyber-DEP"—a website for recruits to access and use while they are in the Delayed Entry Program [3]. The cyber-DEP is now being used in a small pilot program by CNRC. Cyber-DEP allows (a) extra interaction between those in the DEP and their recruiters, (b) more dissemination of information, and (c) some online recruit training before boot camp.




Now we turn to the issue of analyzing the recruiting efficiencies inherent in a summer surge. This slide demonstrates that Navy recruiting makes as much use of a summer surge as it can, given training capacity constraints.

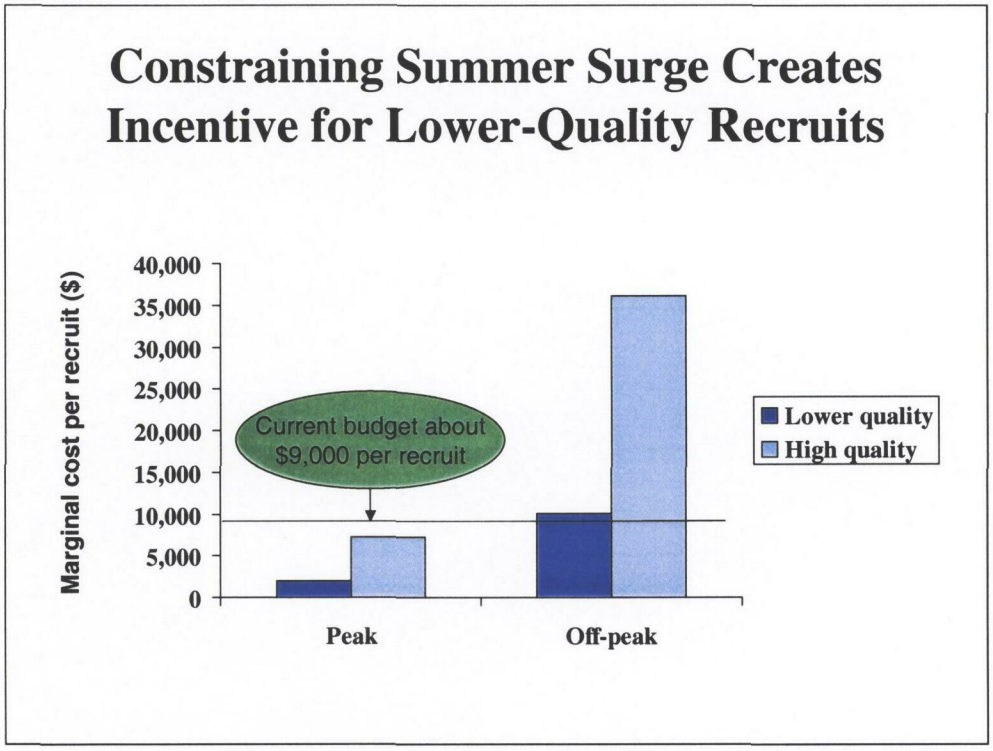
We show the FY99 pattern, which was to bring in almost twice as many recruits per month in the summer surge months of June, July, August, and September as in the other, or off-peak, months of the year. The plotted line shows the number of recruits accessed each month, and the bars show the average on board at the Recruit Training Center (RTC) each month. The average on board can never get all the way up to RTC capacity because, when recruits attrite after recruit divisions are formed up and assigned berthing, their berthing has to remain unoccupied until the rest of their division graduates from RTC. This is done to keep recruit divisions together.




This slide combines the results of two separate analyses: one of the difference in the marginal cost of a high-quality versus a lower-quality recruit, and one of the difference in the marginal cost of a peak (summer-surge) recruit versus an off-peak recruit. Marginal cost—the cost of bringing in additional recruits—runs higher than average cost, which combines the cost of bringing in the easiest recruits to attract with the costs of the hardest-to-attract, marginal recruits. High-quality recruits are defined as those that are high school diploma graduates (HSDGs) who test above average on the AFQT. The two types of lower quality recruits—non-HSDGs with above-average test scores and HSDGs with below-average test scores—are combined into a single lower quality grouping because the marginal costs of both groups taken separately are about the same.

Starting first with the difference in marginal cost between recruits of high quality and lower quality, recent estimates by the Lewin Group show that, for the Navy, high-quality recruits have a marginal cost about four times that of lower quality recruits. We combined this with our peak versus off-peak result, from an ongoing CNA project for N1. We have found that the marginal cost of an off-peak recruit is about five times the marginal cost of a peak (summer-surge) recruit, holding quality constant.

Taken together, this suggests a marginal cost of an off-peak, high-quality recruit of over $30,000, compared with an average cost across all recruits of about $9,000. This doesn't mean, for example, that each new, high-quality, off-peak recruit needs to be paid more than $20,000 in enlistment bonuses. In this example, it might mean that, to bring in 1,000 extra off-peak recruits, the Navy might need to pay enough extra to the new recruits that it would have to pay an extra $1,000 per year to all the recruits who were already entering off-peak before the introduction of incentives.




Now take the same picture and draw in the Navy's current budget, averaged across recruits, of $9,000 per recruit. What happens when the Navy is in a position of needing to bring in extra recruits, or needing to make up for shortfalls in recruiting from earlier in the fiscal year? Recruiting command's most efficient source is to add to summer-surge recruiting, and it can afford to recruit from the high-quality side of that market. Even high-quality, summer-surge recruits cost less than the Navy's average cost of about $9,000 per recruit.

But what happens once the Navy has pushed up against its capacity constraint for summer-surge recruits? Recruiting command must turn to the off-peak market. In this market, recruiting command is only funded to reach the lower quality portion of the market. In other words, having a binding constraint on the number of summer-surge recruits has two effects: it forces recruiting command to operate less efficiently, and it creates an incentive to replace higher quality recruits with lower quality recruits. Thus, the current constraints on summer-surge recruits do not appear to be aligned with the Navy's long-term strategy of building a higher quality force.

## What About Training and Readiness Costs of Summer Surge?

- Causes seasonal variation in training loads and sea manning
- Preliminary training tradeoff
  - Training to summer surge less costly than expanding off-peak recruiting
- Readiness alternative
  - Offering a mix of 3.5- and 4.5-year enlistments and 6-month extension bonus

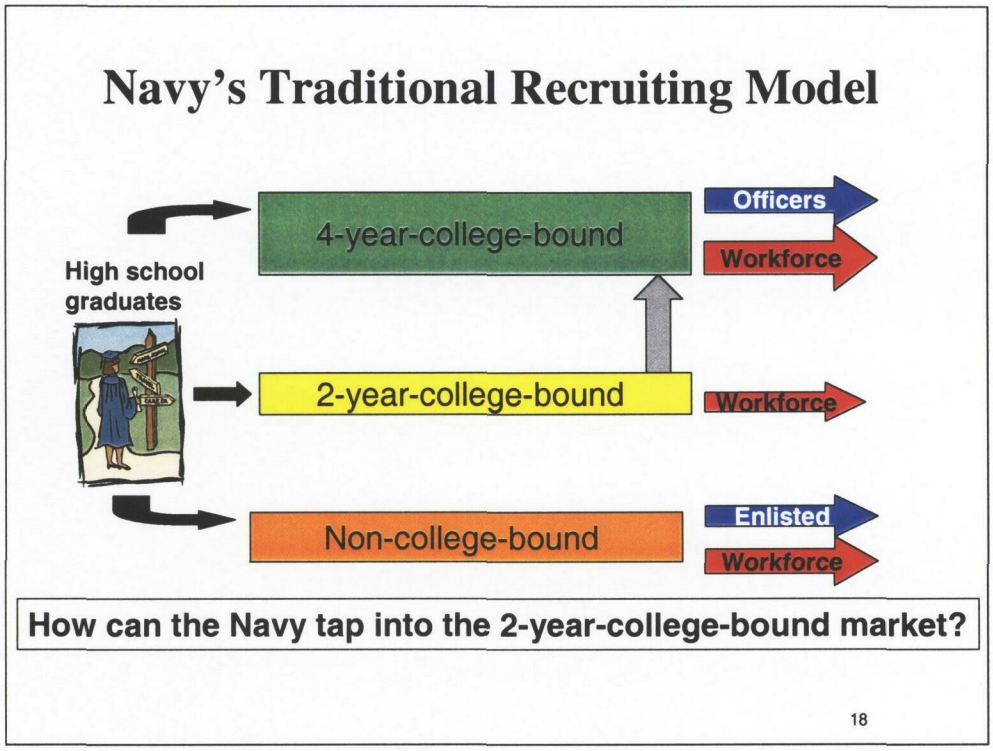
To say that recruiting operates more efficiently with a relaxation of the summer-surge constraint tells only part of the story. A larger summer surge results in training and readiness costs to the Navy. It means that the Navy has to build a larger training capacity to handle the bigger seasonal surge in recruits. And a summer surge is one of the key factors in the annual bathtub in fleet manning. This seasonal variation in manning would presumably worsen with an increase in the summer surge.

For the ongoing CNA project, we have taken a preliminary look at the training cost side of summer surge. What we are finding is that the training costs of expanding the summer surge are slightly less than the recruiting costs of reducing the summer surge. These costs are close to each other and, therefore, do not provide definitive resolution of the summer-surge policy question. Keep in mind, however, that the option of preserving and/or expanding the summer surge is better aligned with the Navy's long-term strategy of building a higher quality force.

The other main cost to summer surge is the resultant seasonal variation in fleet manning. The amount of summer surge the Navy has now is significant, so this is already an issue for the Navy. Expanding the summer surge would exacerbate the seasonal variation in manning. CNA has recently studied this issue to look for ways to remedy the seasonal variation in manning without changing the summer surge in recruiting [4]. We took the approach that, if you can't easily change when recruits enter the Navy, perhaps you can change when they leave so as to reduce or eliminate the seasonal variation in manning. Following this line of reasoning, we developed an option that would reduce considerably the existing seasonal variation: It involves offering a mix of 3.5- and 4.5-year enlistments to some recruits, and, for those recruits who did enter with a 4-year obligation, offering a 6-month extension bonus. Such a bonus would be offered at the 2- or 3-year point and would become operative at the end of the 4-year term.

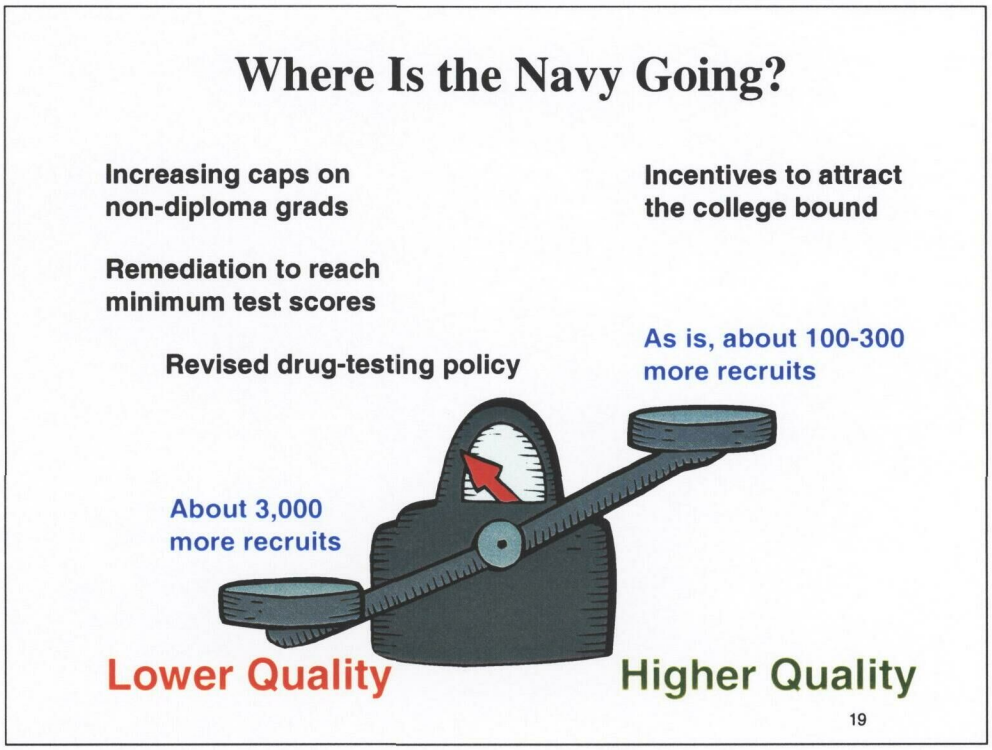
# Expanding the Market

This section examines ways the Navy can expand its efforts to potential enlisted recruits in portions of the market not now being tapped.




The Navy's recruiting model under the All-Volunteer Force has involved recruiting almost exclusively from high school graduates. It gets almost all of its officers from the 4-year-college-bound market and it gets almost all of its enlisted personnel from non-college-bound high school diploma graduates (HSDGs). It does, however, get a small percentage of its enlisted personnel from non-HSDGs. (Non-HSDGs are either holders of General Equivalency Degrees (GEDs) or high school dropouts.)

The 2-year-college-bound market has been left relatively untapped by Navy recruiting as a source of enlisted personnel, yet it is a large and growing pool of potential recruits of high quality. Tapping this pool of potential recruits would align well with the Navy's long-term strategic objective of a higher quality force. This section of the briefing examines the degree to which recent and current initiatives expand the recruiting market toward community colleges, and analyzes what recruitment incentives have relatively more appeal in this market. A discussion of the size of the community college market is in the companion briefing on education. The education briefing also discusses some of the obstacles that need to be overcome to effectively tap this market.



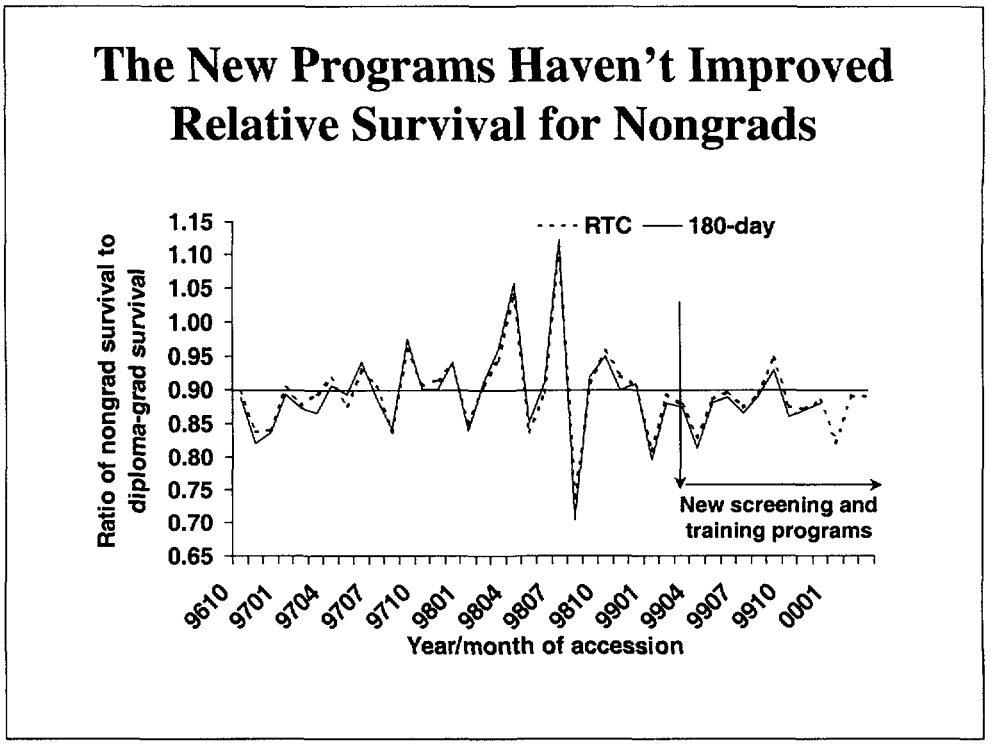

This slide shows the effects (both actual and projected) of recent and current initiatives to solve the Navy's recruiting challenges. Most of these efforts have focused on expanding to the lower quality rather than the higher quality side of the market. This trend should be somewhat expected, given the discussion of constraints to summer surge in the previous section. To reiterate, in a time of recruiting challenges, binding constraints on the size of summer surge will have the effect of substituting lower quality, off-peak recruits for higher quality, summer surge recruits. This works against the Navy's long-term strategic objective of a higher quality force.

The following are a few details on how Navy recruiting is expanding the recruiting market in response to the recent challenges. After missing recruiting goal by about 7,000 in FY98, the Navy decided to expand its cap on non-HSDGs from 5 to 10 percent of all recruits. In addition, a further loosening of the number of non-HSDGs is being pushed in some quarters with a program called the GED Advantage.

The Navy has also taken action to expand the market among potential recruits with slightly lower than minimum test scores. In FY00, it started a program called DEP Enhancement, which remediates potential recruits to help them qualify upon retesting.

Until now, we have discussed quality in the traditional recruiting/attrition sense—that HSDGs with higher than average test scores are higher quality. However, recent changes in drug-testing policy may have a quality effect in a different dimension, by allowing potential recruits who test positive right before shipping to boot camp the opportunity to wait, clean out their systems, and then ship later.

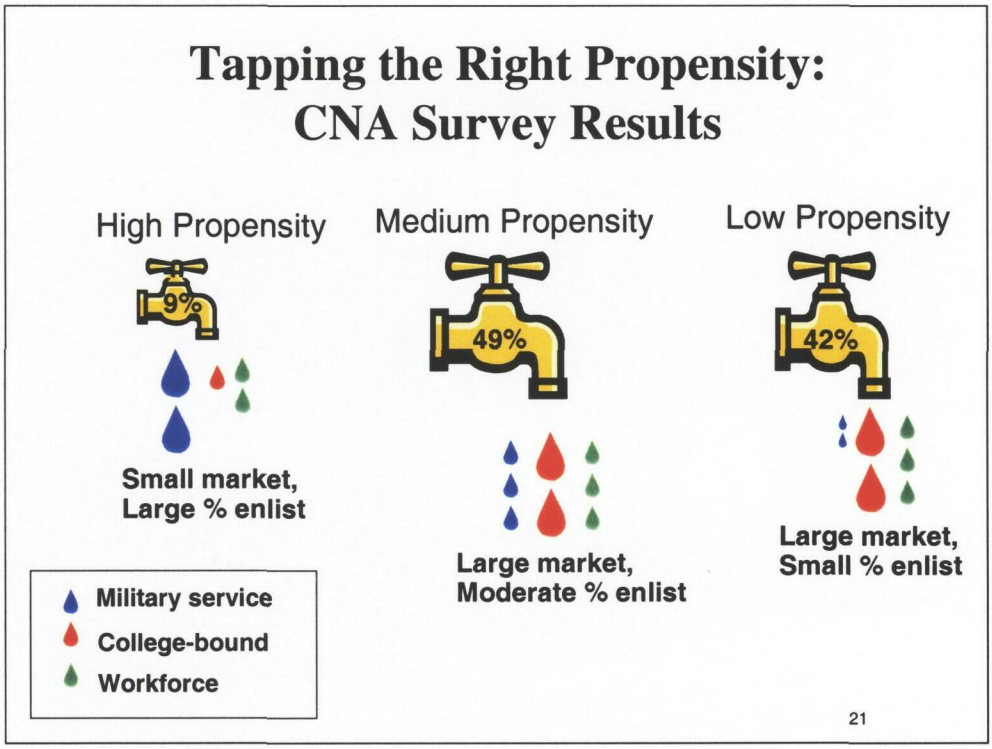
In contrast, programs to tap the community college market have not received much funding and have not yielded much in the way of recruits. These programs are discussed in the companion briefing on education.




At the time the Navy went from 5 to 10 percent of non-HSDGs, it adopted a new screening program (HP3) to reduce attrition among the non-HSDGs and a new training program (ACE) to help non-HSDG recruits better adapt to RTC and to Navy life in general. This slide shows that the combined effect of expanding the number of non-HSDGs and adopting the new screening and training programs has not brought down non-HSDG attrition.

Many factors affect attrition between and during fiscal years. For instance, weather and changes in RTC policies can have an effect on recruit survival. To control for fluctuations in factors that would affect all recruits' survival behavior across time, we have computed the ratio of non-HSDG survival to HSDG survival for FY97 and beyond. Ratios less than 1 mean that the survival of non-HSDGs is lower than that of HSDGs. The ratios are plotted in this graph, as well as the long-term trend of this ratio. The trend line is nearly a straight line (the slope is -.0004), indicating that this ratio has remained relatively unchanged for the last 3 years.

If polices are implemented that are directed at reducing non-HSDG attrition only, and have no impact on HSDG attrition, we would expect to see an increase in this ratio in the time since the new policies were in effect. As we can see from this slide, the ratios for both RTC and 180-day survival have been below the long-term trend line since the change was implemented for all months except September 1999. Thus, relative to HSDG survival, non-HSDG survival has not improved since the cap went from 5 to 10 percent and the new screening and training programs were adopted.




Now we turn to expanding the market for higher quality recruits. This slide makes the argument that appealing to those bound for college will be a key part of that effort. As background to this slide, CNA recently conducted a survey of high school youth that asked them about their propensity to serve in the military and their post-high-school plans, and then gave them a series of choices across different recruitment incentives [5]. Our analysis then allowed us to measure how a respondent's relative preference for a given recruitment incentive compared with other recruitment incentives.

The faucets in this slide represent the survey results on propensity. The low-propensity market is significant (42 percent), but, because these respondents are indicating that they will definitely not join the military, this market is not promising for the Navy. The high-propensity market (definitely or probably will join the military) is small (9 percent) and is already pretty well tapped out by the four services. The medium-propensity market (probably will not join the military) is large (49 percent) and is the one the Navy will have to tap to reach more high-quality recruits.

The droplets in the slide represent the survey results on post-high-school plans. The high-propensity youth are much more likely to plan on entering the workforce upon high school graduation. The medium-propensity youth are much more likely to pursue college or some sort of postsecondary schooling upon high school graduation. Therefore, expanding the market to medium-propensity youth will likely mean figuring out ways to better appeal to youth who plan to pursue postsecondary education.

## Education Matters to the High-Quality Market

| Incentive | Medium propensity | High propensity |
|---|---|---|
| Occupation | | X |
| Enlistment Bonus | | X |
| Shorter service obligations | X | |
| Navy College Fund | X | |
| College credit for Navy training | X | |

This slide shows some results from our analysis of given recruitment incentives relative to other incentives. Choice of occupation and size of enlistment bonus are relatively more important to the high-propensity market. For the medium-propensity market—which is much more likely to be college bound and is the most promising source for additional high-quality recruits—shorter service obligations and college-related incentives are relatively more important. The two college-related incentives we included in the survey were size of Navy College Fund offered and granting college credit for Navy training.

The companion briefing on education discusses the size of the community college market, how little it is now being tapped by the Navy, and some of the obstacles that need to be overcome to effectively tap it. The results above tie in to that by showing, unsurprisingly, that offering relatively more in the way of college-related incentives is the best way to appeal to this market.

Expanding recruitment incentives in a way to reach the community college market will come at a cost because that group has more competing opportunities than those who enter the workforce upon high school graduation. Initiatives designed to tap the community college market will be endangered if they are interpreted as diverting resources needed to meet current challenges rather than investing in the future. However, investing in the future quality of its recruits is an important element of the Navy's long-term strategy of building a higher quality force.

Investing in new recruiting markets is not the answer in and of itself. Recruiters will have to learn how to operate effectively in these markets. Thus, changes in the culture and philosophy of recruiting are required before such investments can pay off.

# Reducing Accession Requirements

This section examines how higher retention can be used to reduce enlisted accession requirements.

## What Drives Accession Requirements?

- What is the tradeoff between accessions and attrition/reenlistments?
- How much more do increased reenlistments cost?
- What are the benefits from seniority?

First we calculate the steady-state tradeoff between accessions and attrition. And we do the same for the tradeoff between accessions and reenlistments. These are shown as aggregate, Navy-wide tradeoffs, as if the attrition reduction or reenlistment improvement were made across all ratings. Next we cost out the reenlistment/accession tradeoff for three groups of ratings: a high-tech, a mid-tech, and a low-tech group of ratings. This allows the more realistic assumption that reenlistment improvements would not necessarily be made equally across all ratings. Finally, we use productivity estimates from comparable civilian occupations to put a dollar value on the productivity benefits of higher seniority.

## How Many Accessions Can You Save?

| | Steady-state accession reduction |
|---|---|
| Boot camp attrition from 15 percent to 12 percent | 1,900 |
| Post-boot-camp attrition from 8 percent to 7 percent per year | 1,400 |
| First-term reenlistment from 48.5 percent to 50.5 percent | 1,200 |

Here are the tradeoffs. We chose current levels as the baseline starting point for attrition/reenlistment. To illustrate changes in attrition/reenlistment, we used late-1980s levels as our reference point. So if the boot camp attrition rate were to permanently remain 3 percentage points lower, the steady-state decrease in accessions would be 1,900 per year. Similarly, a 1-percentage-point drop in annual post-boot-camp, first-term retention would decrease steady-state accessions by 1,400 per year. Finally, if the first-term reenlistment rate were to permanently increase by 2 percentage points, steady-state accessions would drop by 1,200 per year.

We make several observations about these tradeoffs. First, it appears that improvements in attrition have a lot of potential for achieving large reductions in accessions. Second, achieving late 1980s levels of both attrition and reenlistment rates would decrease accessions considerably. One must recognize, however, that the current strength of the civilian economy may not make such large improvements possible.

The remaining part of this briefing focuses on the tradeoff between reenlistments and accessions. Our companion briefing on attrition contains further analysis of attrition issues.

## Cost/Savings of Buying Extra Retention (Enough for 100-Accession Cut)

| | Retention and seniority costs | Recruiting and training savings |
|---|---|---|
| High-tech sample (AT,ET,FC,CTM) | $6.8M | $5.0M |
| Mid-tech sample (AD,EM,GSE,GSM,MM) | $6.0M | $3.5M |
| Low-tech sample (AK,SK,MS) | $7.8M | $2.7M |

Because the costs and savings vary so widely by rating, we decided that the tradeoff between reenlistments and accessions should be examined in some rating-specific fashion, not simply in the aggregate. As a first step, we estimate the dollar costs and benefits—extra spending on reenlistment bonuses and seniority, and savings from recruiting and training.

We selected ratings that have been matched to civilian equivalents [6]. We divided them into three groups: high-tech (AT, ET, FC, and CTM), mid-tech (AD, EM, GSE, GSM, and MM), and low-tech (AK, SK, MS). For each group, we analyzed the steady-state costs and savings of increasing reenlistment rates enough to generate a steady-state accession cut of 100 per year, a simulation that allows us to compare results across groups.

The steady-state retention and seniority costs vary somewhat across the three groups. The determining factors that cause this variation are (1) different baseline reenlistment rates and (2) different responsiveness to reenlistment bonuses. If there is already high retention in the rating group, it costs more to use bonuses to increase retention because the higher bonus level must be paid to everyone who is already reenlisting without getting the higher bonus level. This explains why the mid-tech group has the lowest cost; the baseline reenlistment rates are much lower than either of the other two groups (which both have about the same baseline reenlistment rates as each other). What differentiates the high-tech cost from the low-tech cost is responsiveness to reenlistment bonuses. Based on historical data, these high-tech ratings have been more responsive to reenlistment bonuses than these low-tech ratings.

The steady-state recruiting and training savings vary more widely across the groups. The high-tech groups draw almost exclusively from the high-quality A-cell recruits (HSDGs with above-average test scores), who are much more expensive to recruit. They are also much more expensive to train, as a direct function of the length of their training pipelines.

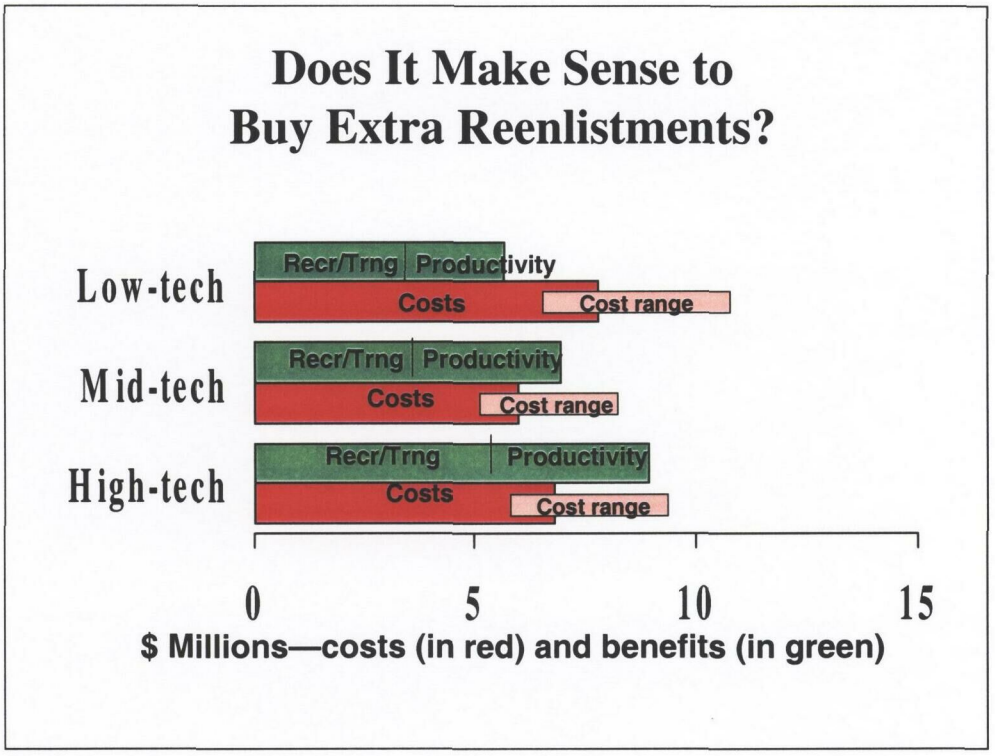
## Cost/Savings of Buying Extra Retention (Enough for 100-Accession Cut)

| | Retention and seniority costs | Recruiting and training savings | Annual increase in productivity |
|---|---|---|---|
| High-tech sample (AT,ET,FC,CTM) | $6.8M | $5.0M | 3.6% |
| Mid-tech sample (AD,EM,GSE,GSM,MM) | $6.0M | $3.5M | 3.3% |
| Low-tech sample (AK,SK,MS) | $7.8M | $2.7M | 2.6% |

The first two columns show that, even for the high-tech group, the dollar costs of force aging exceed the savings in the steady state. However, the retention and seniority costs and the recruiting and training savings tell only the cost efficiency part of the story. To truly get at effectiveness, one has to consider that substituting reenlistments for accessions will create extra seniority in the fleet, and that extra seniority has some readiness value.

In the Navy, the benefits of seniority can be understood as Sailors' contribution to readiness; on the civilian side, such benefits from seniority are measured as a productivity return to an extra year of experience. It is likely that the productivity benefit of seniority is greater in the high-tech than the low-tech group. In the low-tech group, we expect a learning curve that flattens out early in the career. In the high-tech group, we expect each year of experience to have a significant effect on a Sailor's productivity.

To test this idea, we made the assumption that similar returns to experience or seniority exist in Navy jobs as in their civilian counterparts. We used the Current Population Survey (CPS) to estimate the effects of experience on productivity for each of the civilian counterpart occupations. The productivity estimates above are weighted averages of the estimates for each occupation in the group. Based on their civilian counterparts, one would expect increases in productivity of 3.6, 3.3, and 2.6 percent with every extra year of service in the high-tech, mid-tech, and low-tech rating groups, respectively.




This slide shows in picture form the recruiting and training savings and the retention and seniority costs from the previous table. It also adds two elements. It quantifies the dollar benefit of the increase in productivity from increasing reenlistments enough to decrease accessions by 100 in each rating group. The productivity increases are based on the measures calculated using the civilian counterpart occupations. And it puts in a cost range to supplement the point estimate.

The larger cost bar represents our best estimate of the retention and seniority costs of increasing reenlistment bonuses enough to cut accessions by 100 in each rating group. But one of the factors in the calculation is how responsive Sailors are to increases in SRBs. In previous research, a range of estimates has been developed. Recognizing that, we put in the cost range, to reflect the fact that the true cost is likely to fall somewhere in the range, but not necessarily at our point estimate.

After factoring in productivity increases from higher seniority, aging the force using SRBs makes sense across the whole cost range for the high-tech ratings. In the mid-tech rating group, aging the force using SRBs appears to make sense using our best cost estimate, but, because it doesn't make sense for the entire cost range, there may be some risk of not getting full return on SRB investment in this group. Aging the force does not appear to make sense, from a return on investment standpoint, for the low-tech rating group.

## More Readiness or Fewer People?

- All else equal, if you get extra readiness from extra retention, you can:
  - Take the higher readiness
  - Get the same readiness with fewer people
- But force is getting more junior each year, because drawdown seniority is going away
  - Higher retention would slow the decline

If more senior people were more productive, increasing reenlistments would be expected to improve readiness. Another way to think about this is that, with more productive people, the same level of readiness could be achieved with fewer people.

We would argue that the Navy needs to hold on to any additional readiness it can achieve from increasing reenlistments and reducing accessions because, over the next 5 to 10 years, the Navy is facing a drain in seniority even if attrition and reenlistment behavior stay fixed. This is a leftover effect of the strategy the Navy pursued in the drawdown. In the 1990s, the Navy held on to much of its pre-drawdown seniority, and met its drawdown targets by accessing fewer Sailors. This created a temporal increase in seniority that has benefited Navy readiness for the past 10 years. (It also explains why advancement rates have been so low for the past 10 years.) But the drawdown-induced seniority is reaching retirement age and will finish passing out of the force over the next 5 to 10 years. Higher retention would slow this decline in drawdown-induced seniority, but it would not completely offset it.

## Bottom Line

- With current limits on summer surge, recruiting not funded to reach high-quality market
- It's not just money—changes in the culture/ philosophy of recruiting are necessary
- Better retention substitutes for accessions
- Better retention also has readiness payoff, but can't fund it by recruiting/training savings alone

This briefing examined recruiting more efficiently, expanding the Navy's recruiting market, and reducing accession requirements. In each section, we tried to place our analysis in the context of the Navy's long-term strategy of building a higher quality force.

In the efficiency section, we concluded that constraints on the size of the summer surge of accessions are not aligned with the Navy's long-term strategy of building a higher quality force. Because of the high school graduation cycle, it is easier to recruit high-quality high school seniors for summer shipping than to recruit workforce recruits later in the year. To the degree that constraints are placed on the number of recruits who can ship in the summer, the Navy is forced into the off-peak workforce market in which high-quality recruits are much less available.

In the section on expanding the market, we analyzed which incentives have relatively more appeal to potential high-quality recruits in nontraditional markets—such as the community college market. Investments in these incentives will come at a cost, and they will be endangered if they are interpreted as diverting resources needed to meet current challenges rather than as investing in the future. However, putting more dollars toward reaching new recruiting markets is not the answer in and of itself. Changes in the culture and philosophy of recruiting are required before such investments can pay off.

Third, pursuing a long-term strategy of substituting better retention for accessions alleviates current pressures on recruiting and is also aligned with the Navy's long-term strategy of building a higher quality force. We found that using reenlistment bonuses to increase retention is cost-effective, at least for the more technical ratings, if one factors in a measure of the readiness benefit of the higher seniority.

# References


[1] Martha E. Koopman and Heidi L. W. Golding. *Optimal Manning and Technological Change,* Jul 1999 (CNA Research Memorandum 99-59)

[2] Peggy A. Golfin and Michael Y. Katz. *Effectiveness of the Navy's Cyberspace Recruiting Efforts During CY 1998,* Jun 1999 (CNA Research Memorandum 99-14)

[3] CNRC Cyber DEP. Website http:\\nrp.cna.org

[4] Jeremy Arkes and Henry Griffis. *Seasonal Patterns in Sea Fleet Gains and Losses,* Oct 1999 (CNA Annotated Briefing 99-84)

[5] Amanda B. N. Kraus, Henry S. Griffis, and Peggy A. Golfinl. *Choice-Based Conjoint Study of Recruitment Incentives,* Aug 2000 (CNA Research Memorandum D0001428.A2)

[6] Michael L. Hansen. *Compensation and Enlisted Manning Shortfalls,* Sep 2000 (CNA Research Memorandum D0001998.A2)

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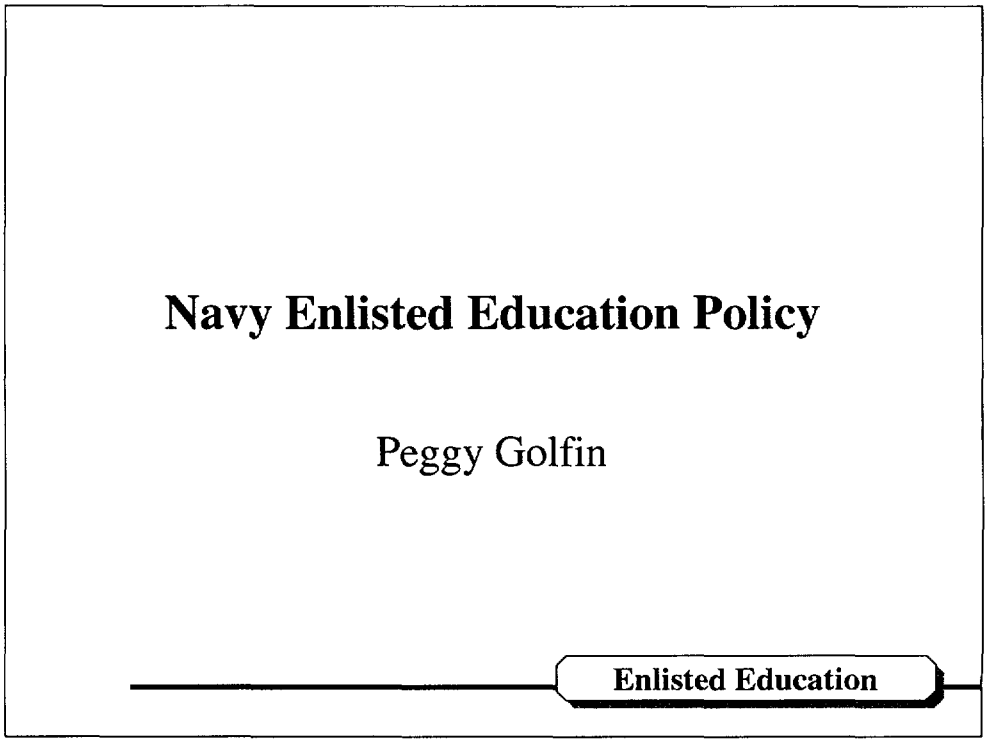
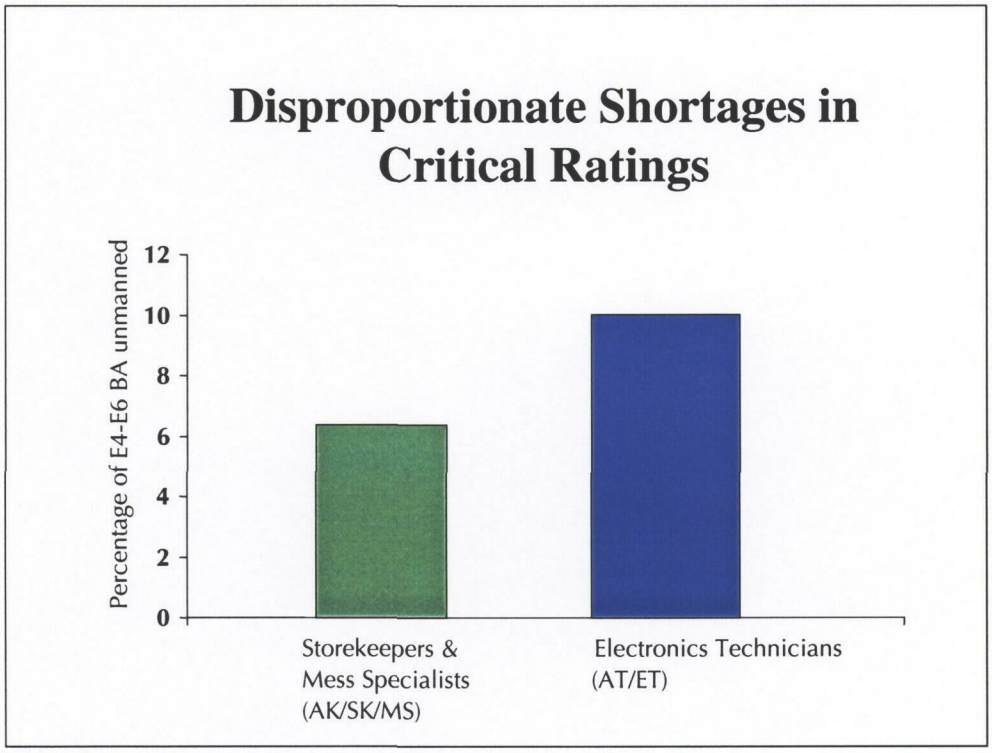



Both the Navy and the civilian labor market have rapidly increasing requirements for educated, high-tech employees. Never before has the Navy faced such stiff competition for high-quality enlisted recruits, and the competition will most likely get tougher. While the Navy's demand for high-quality youth is increasing, the supply is decreasing, as growing numbers of high school graduates pursue 2-year-college degrees after high school, followed by high-wage, high-tech civilian employment. With unemployment at historically low levels, civilian employers are responding to the competition with higher salaries, large signing bonuses, and creative education benefits. Because the Navy is constrained in terms of salaries and signing bonuses, we argue in this briefing that the Navy must instead turn to education benefits to attract the high-tech, high-quality youth it increasingly requires to fill the enlisted ranks.

Many of the increased high-tech requirements in the civilian workforce, as well as in the Navy, are for workers with computer-related skills. The Navy's computer requirements, as well as numerous other skill requirements, are largely based on commercial-off-the-shelf technology, the training for which can often be provided at lower cost by civilian institutions, especially public 2-year community colleges. Partnerships with these institutions can provide new recruits additional and, most importantly, realistic opportunities to earn college degrees while on active duty, as well as reduce the cost to the Navy to train enlisted personnel. This briefing discusses options for the Navy to tap into these new markets.




We first illustrate with a number of facts and trends why education in the Navy must be a priority. In this slide, we surface show the difference in FY99 manning for a sample of low-tech ratings (and aviation storekeepers and mess specialists) versus a sample of high-tech ratings (surface and aviation electronic technicians). Each of these categories represents about 10,000 billets authorized (BA) for paygrades E4 through E6. For the low-tech ratings, the percentage of BA that was unmanned was about 6 percent, compared with more than 10 percent for the high-tech ratings—a 66-percent greater gap in billets authorized.* Yet, to achieve even this relatively low level of manning in these high-tech ratings, the Navy had to make large investments in Enlistment Bonuses (EBs) and in Selective Reenlistment Bonuses (SRBs) to recruit and retain ATs and ETs. Manning the low-tech ratings required relatively small investments in EBs and SRBs.

*Source: Enlisted billet file.

## High-Tech Manning Issues Will Not Go Away

- New platforms will require fewer people but with more education
- Technology is increasing demand for new skills
  - Billets authorized for network administrators grew from 0 in FY96 to 2,307 in FY00
- Civilian competition will remain strong
  - Jobs for people with Associate degrees are growing more than 110% faster than overall job growth

It is unlikely that the manning difficulties will go away in the near future—in terms of both the magnitude of the shortfall and the high levels of EBs and SRBs that will be needed to satisfy manning requirements in the high-tech ratings. We base this conclusion on the following:

- New platforms coming on line in the next decade, such as the DD21, will require smaller crews, but a higher proportion of the enlisted crew will need to be more broadly educated. A recent CNA study concludes that technological advances in 21st century Navy platforms, in terms of both equipment and systems, will require a more skilled and more technically literate enlisted force with strong problem-solving, decision-making, and communication skills [1].
- Technology is increasing the demand for new skills, across ratings. For instance, in FY96, the Navy had no requirements for an enlisted network administrator. In that year, the Navy created NEC 2735, Information Systems Administrator, to serve that function. The BA for that NEC have grown from 0 in FY96 to 2,307 in FY01.* The requirements for computer networks are increasing throughout the Navy, to support everything from weapon systems to supply functions. Even traditionally low-tech ratings rely increasingly more on technology, especially desktop computing.
- Civilian requirements for an increasingly high-tech workforce mirror those of the Navy, and are based on similar phenomena. For instance, the Bureau of Labor Statistics predicts that jobs that usually require an Associate degree (the types of jobs that are most similar to the high-tech enlisted ratings) will grow at a rate that is more than 110 percent greater than the overall growth of all jobs in the economy in the next decade [2]. Backup slides provide details about changes in the civilian workforce predicted for 2008.

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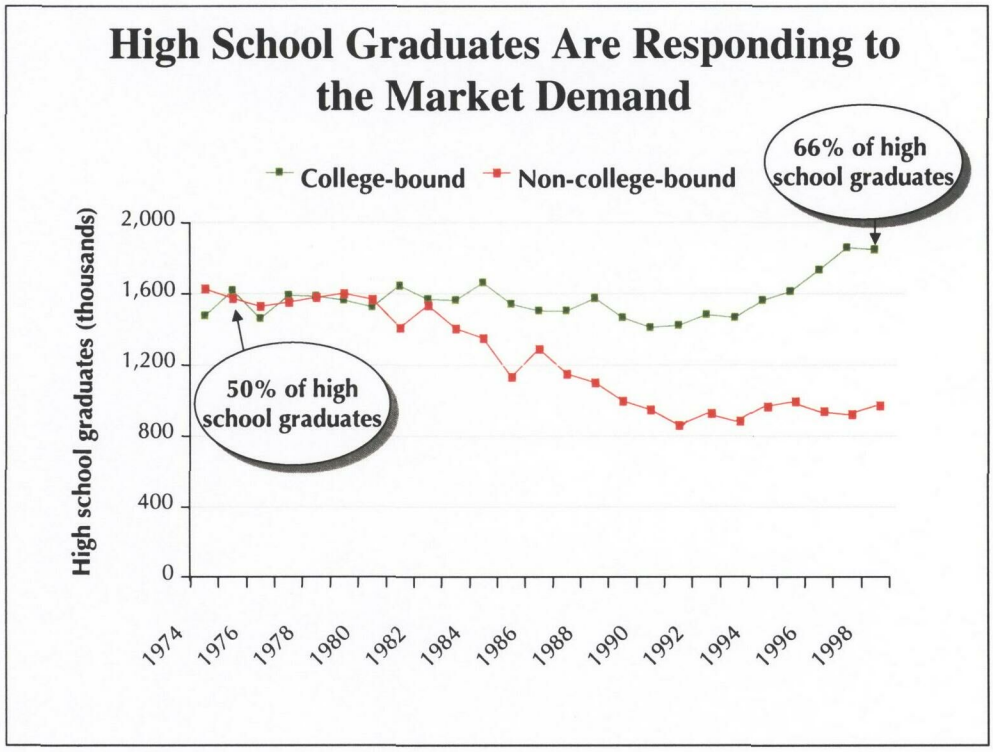
*Source: IT Enlisted Community Manager – N132DG.




In response to the growing civilian demand for educated workers, more and more high school graduates are seeking postsecondary education. This graph shows that, at the beginning of the All-Volunteer Force (AVF), 50 percent of high school graduates went directly to college. Currently, almost two-thirds of high school graduates will attend college immediately after graduation: 24.4 percent attend a 2-year college and 41.2 percent attend a 4-year college [3].

This graph also illustrates that the Navy's traditional enlisted market—non-college-bound high school graduates—has decreased sharply in the past few decades in both absolute and relative terms. This declining population and increased college enrollment have contributed to the difficulty that all of the services have had in meeting their enlisted recruiting goals in the past several years. Other important factors include a sustained low unemployment rate and a reduced veteran and active duty population. Other factors that are less well understood include the policies in effect during the drawdown, such as a reduction in advertising, and the increase in operations other than war.

The trends cited in both this slide and the previous one indicate that the Navy is, and will continue to be, in stiff competition with civilian employers for high-skilled and high-quality youth. As we will illustrate later, the Navy is also competing with the other services.

## Bottom Line

- Education in the Navy needs to be a priority
- To make this happen, Navy culture must change
- Change will come about if incentives and institutions are aligned correctly
  - Provide realistic education opportunities
  - Expand college-bound recruiting
  - Integrate civilian education with Navy training

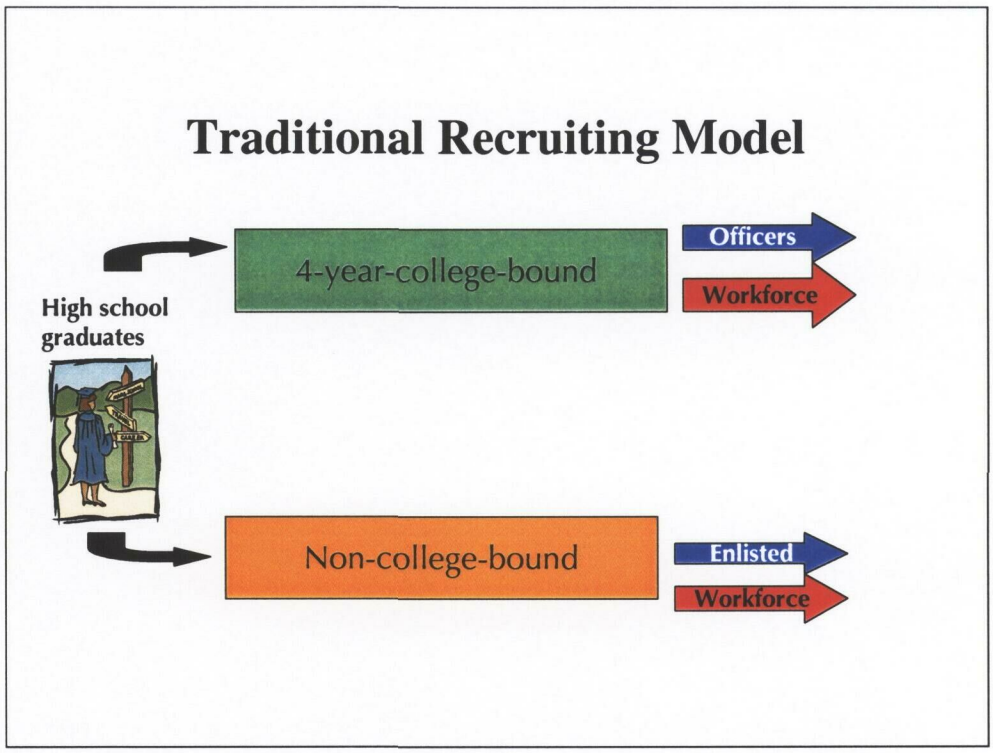
To meet the significant challenges of recruiting and retaining increasingly more high-quality, high-tech enlisted Sailors in the near to medium term, the Navy will need to aggressively recruit from the 2-year-college youth market. Such efforts will be successful only if high-quality youth view the Navy as an attractive alternative to college.

These are not just recruiting and Voluntary Education responsibilities. Such efforts will require the Navy to make education a priority at the highest levels, ensuring that education become a valued component of Navy culture. Such a comprehensive change will take time, and will require incentives and alignment of key institutions so that they support and promote education. In the remainder of the briefing, we discuss our recommendations to help achieve this goal. The recommendations follow three themes:

•Provide realistic college education opportunities to enlisted Sailors. This means more than just creating and providing voluntary education programs. The Navy needs to work harder at creating new programs and supporting old ones so that Sailors can have realistic expectations of earning a college degree while on active duty in a reasonable amount of time.

•Expand recruiting efforts and incentives to the college-bound high school graduate market. Having realistic education opportunities must coincide with such an effort. This also includes recruiting from the 2-year-college-graduate market, which requires new incentives that help to make the Navy competitive with civilian employers.

•Integrate civilian education with Navy training. This step involves tapping into civilian education institutions as a source of training and establishing mechanisms by which civilian training credentials can be evaluated and substituted for Navy training. Recruits who enter with some college credits or all of a 2-year degree must be provided meaningful training and jobs that reward and draw upon their civilian-acquired skills.



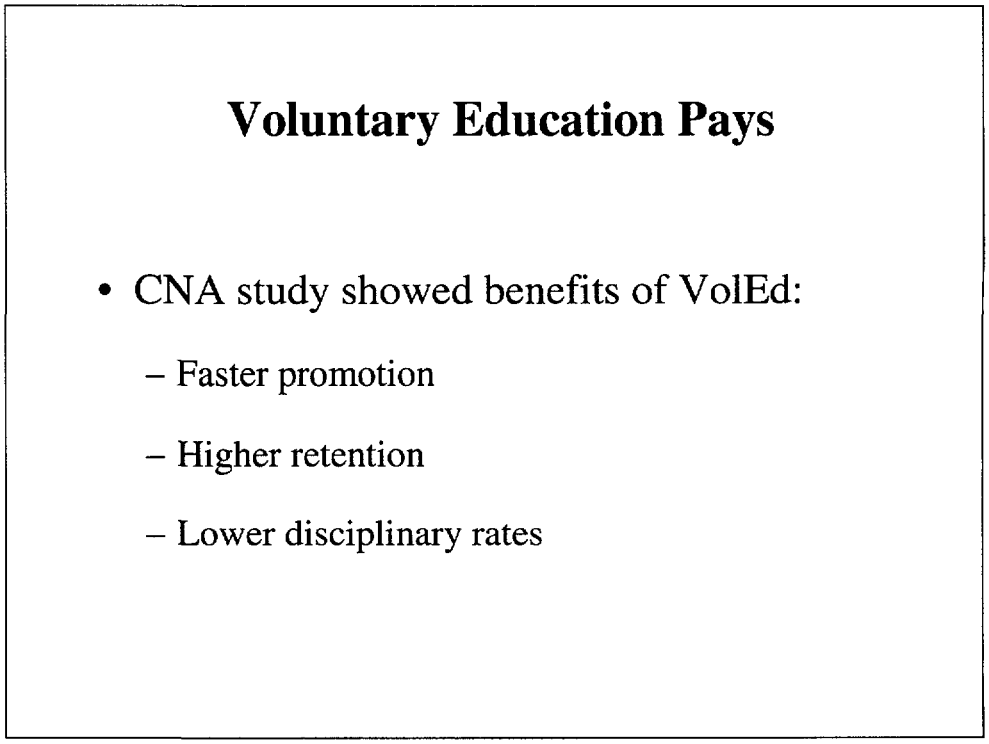

In this next section, we will explain our recommendations presented in the previous slide. But first, we provide some background concerning the value of education to Sailors and to the Navy.

As this slide shows, the Navy recruits almost exclusively from the traditional non-college-bound high school graduate market. The high school graduate market divides into two distinct markets. Officer recruiters recruit exclusively high school graduates who go directly to a 4-year college (or beyond) and subsequently graduate. Enlisted recruiters recruit new high school graduates who have not pursued a college degree. Thus, the high school graduate market has been considered to consist of two types of graduates—those who subsequently graduate with Bachelor's degrees and those who don't enter college after graduation. Historically, recruiters have devoted minimal resources to recruiting college dropouts or high school graduates in the 2-year-college market.

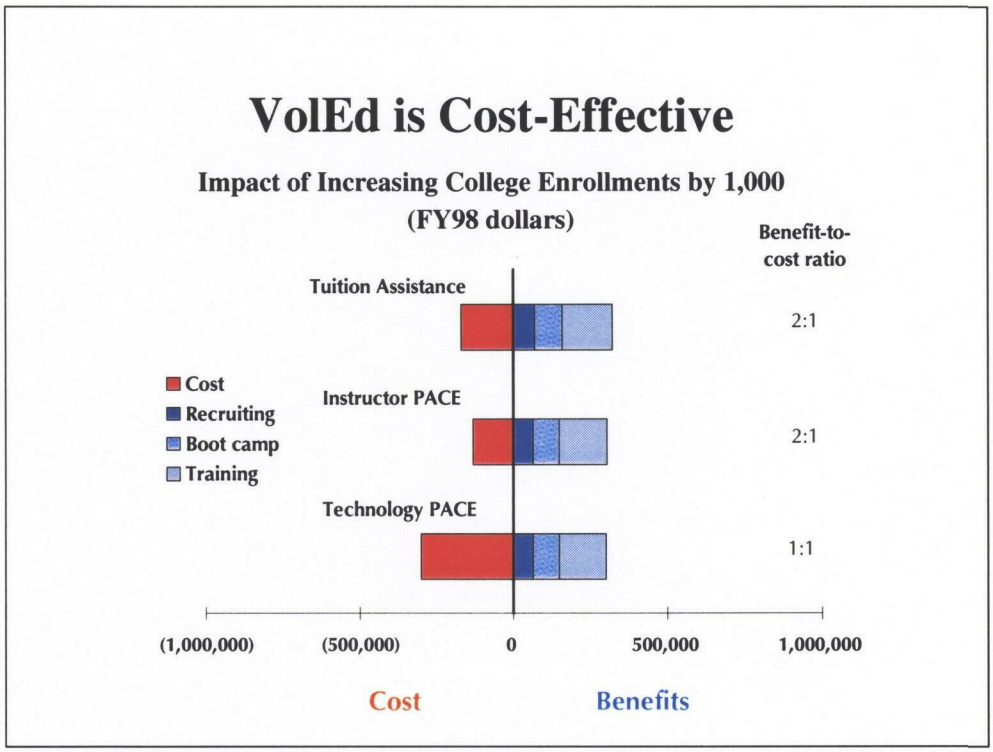
## Sailors Join for Education Benefits

- 1999 New Recruit Survey:
  - 91% want the Navy's help in achieving their education goals
  - 84% plan to work on a college degree during enlistment
  - 46% join for college money or to attend college while on active duty

The enlisted ranks have overwhelmingly consisted of high school graduates with no college experience. Even so, this slide shows that a large percentage of these recruits are still interested in higher education. For instance, according to the 1999 New Recruit Survey, 91 percent of new recruits surveyed said that they want the Navy's help in achieving their education goals, which range from earning a GED, to improving their ASVAB scores to qualify for another rating, to earning a college degree either on active duty or afterwards. In fact, the vast majority plans to work toward a college degree during enlistment, and 46 percent of new recruits said that money for college was one of the top three reasons they joined the Navy [4].



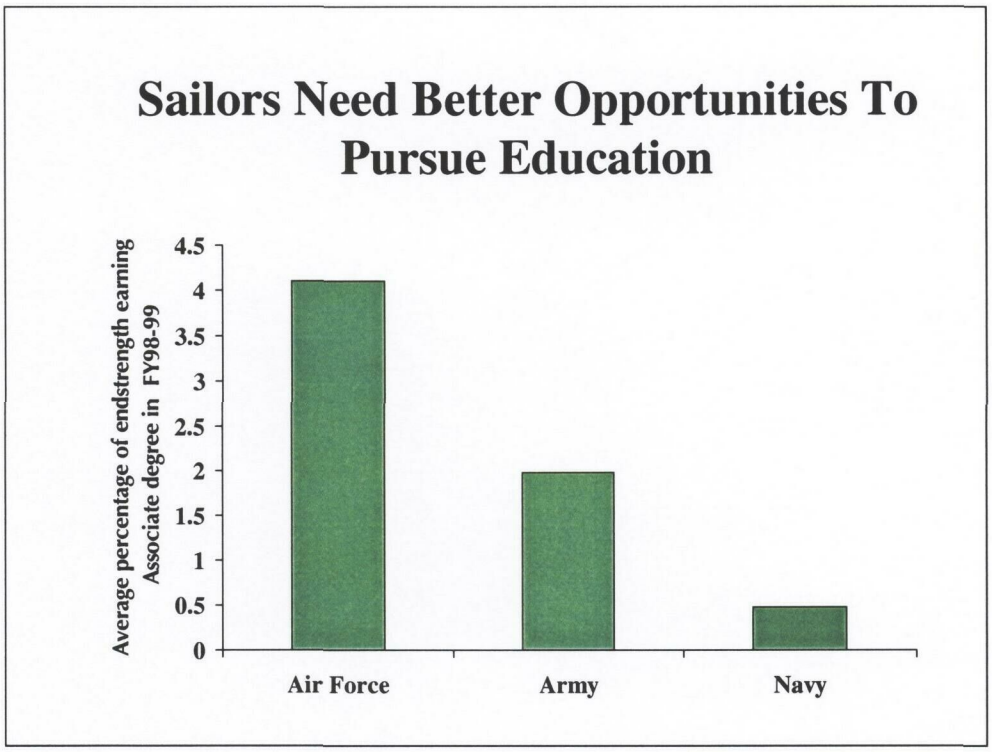

The fact that so many new recruits have an interest in pursuing higher education while on active duty is actually beneficial to the Navy. A recent CNA study [5] determined that the Navy's Voluntary Education (VolEd) programs have large payoffs. The benefits that accrue are the result of increased retention, faster promotion, and reduced disciplinary problems of those who participate in voluntary education (both academic skills and college programs). For instance, the first-term reenlistment rate of Sailors who do not earn any college credit while on active duty is 31 percent. For those who earn 15 credits, the reenlistment rate increases to 37 percent. And for those who earn 60 credits—approximately equivalent to earning an Associate degree—the reenlistment rate is 55 percent.




This study concluded that the benefits that result in higher retention of VolEd participants outweigh the cost of VolEd to the Navy. Accounting for the savings in recruiting and training that the higher retention affords, the study concluded that the Navy saves $2 for every $1 spent in Tuition Assistance (TA) and instructor Program for Afloat College Education (PACE), and a $1 dollar benefit for every $1 spent in technology PACE.*

Thus, an overwhelming number of the recruits that the Navy currently attracts are interested in pursuing college degrees while on active duty, and it is cost-effective for the Navy to promote such opportunities.

*The benefits to technology PACE, which includes instruction via CD ROM or internet instruction, are lower in large part because the failure rate from these courses is higher than from more traditional methods. The cost-effectiveness of this type of instruction may improve as we gain understanding of how people learn from these nontraditional methods.




In spite of the existence of numerous VolEd programs and the stated intentions of new recruits, few Sailors, both in absolute numbers and relative to other servicemembers, are able to take advantage of these incentives. This graph shows the average percentage of active duty enlisted servicemembers who earned Associate degrees in FY98-99, by service. Airmen were eight times as likely, and Soldiers four times as likely, as Sailors to earn Associate degrees on active duty in FY98-99 [6].

The differences across the services can be attributed to a number of factors. First is the nature and availability of VolEd opportunities. For instance, all of the services offer the Montgomery GI Bill and Tuition Assistance (PACE is unique to the Navy, but is simply a more generous TA offered to Sailors on sea duty). And the Army, Marine Corps, and Navy offer Servicemembers Opportunity Colleges (SOC) benefits.

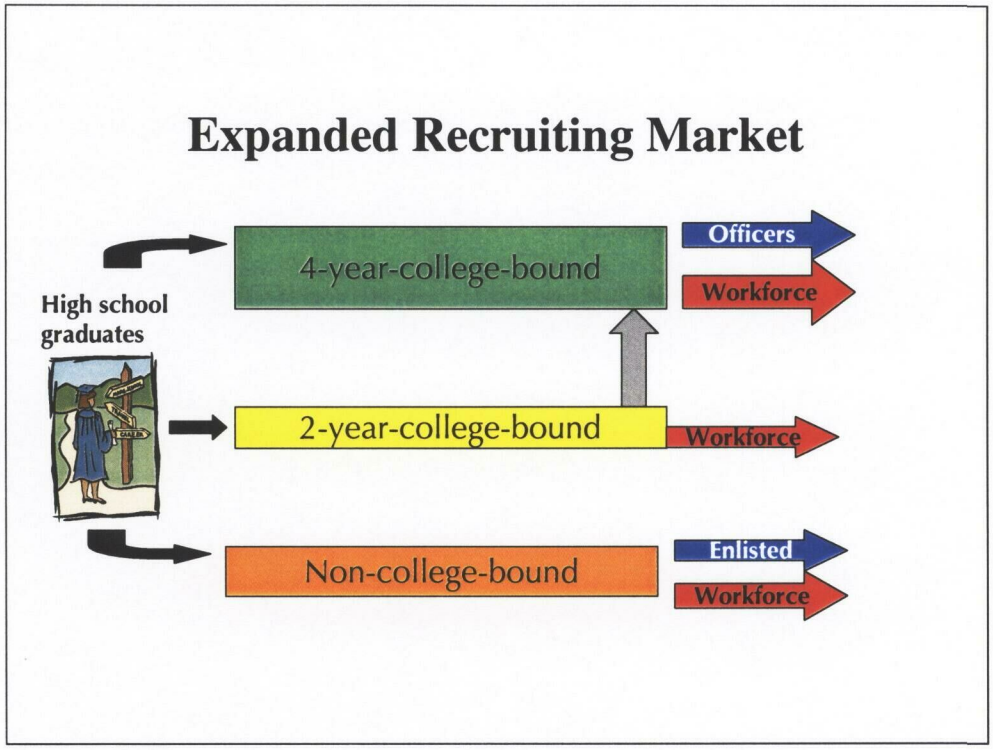
Each service also offers its own unique college incentives. For instance, the Air Force has the Community College of the Air Force, in which Airmen earn credits at the end of recruit training, and for all subsequent training from the Air Force's own regionally accredited community college, which has created tailor-made degrees for Air Force enlisted training. The Army has recently instituted several initiatives to make it easier for Soldiers to earn college degrees, including Army College First, which we discuss later. The Navy has the Navy Learning Network and the newly formed Navy College Program.

Differences in college degree attainment between the services may be attributable in some part to their unique college incentives, although, as we argue below, we do not believe that this is the most significant factor. It is also important to note that, in spite of all of the services' incentives, collectively they have failed to attract significant numbers of the growing college-bound high school graduate market, as we pointed out in a previous slide.

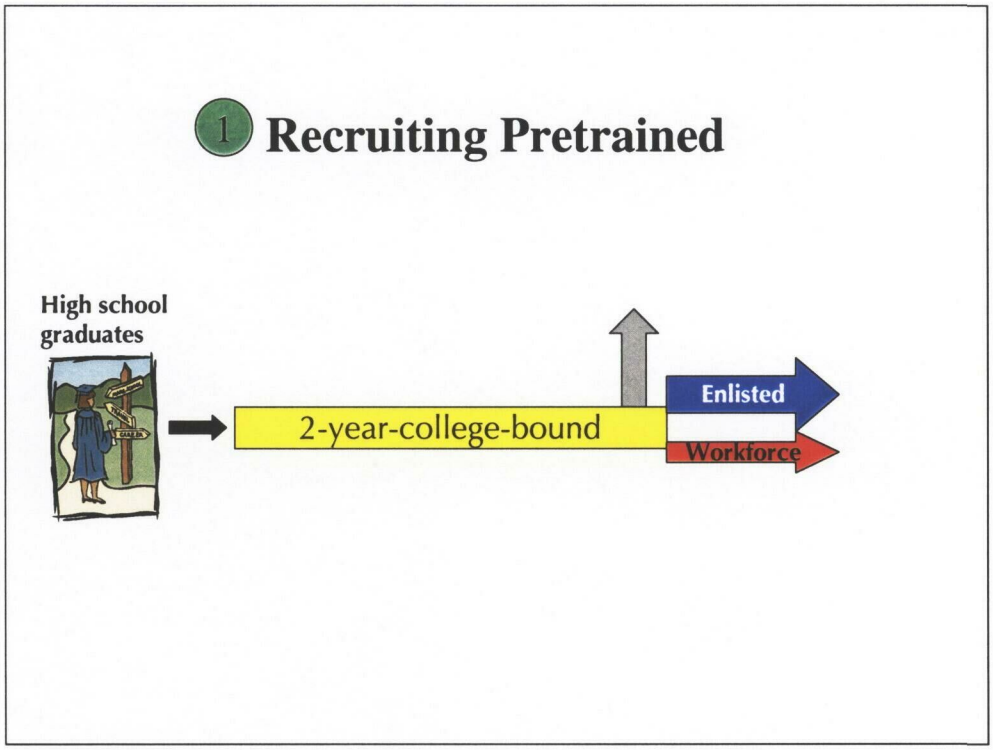
We believe that the most important factor contributing to the differential in degree attainment is the nature of sea duty, deployments, and training requirements, which make it relatively more difficult for a Sailor to find time to pursue a college education on active duty. Mitigating this is not easy; the Navy cannot risk readiness at the expense of voluntary education. Also, changing the culture to make even minor improvements is a difficult task. For instance, in the recent past, the Navy has changed its policy a number of times concerning the awarding of points toward promotion for college degrees, depending in large part on the viewpoint of top enlisted Navy personnel. Sailors require long-term policies to make appropriate career choices.

But the lack of emphasis on education in the Navy is evidenced by an even more fundamental fact. The Navy currently does not keep track of a Sailor's degree attainments in any of the most significant personnel or voluntary education databases.* If education were considered an important component of a Sailor's career and to overall productivity and readiness, the Navy would keep as close an accounting of college degrees as it would of NECs, for example.

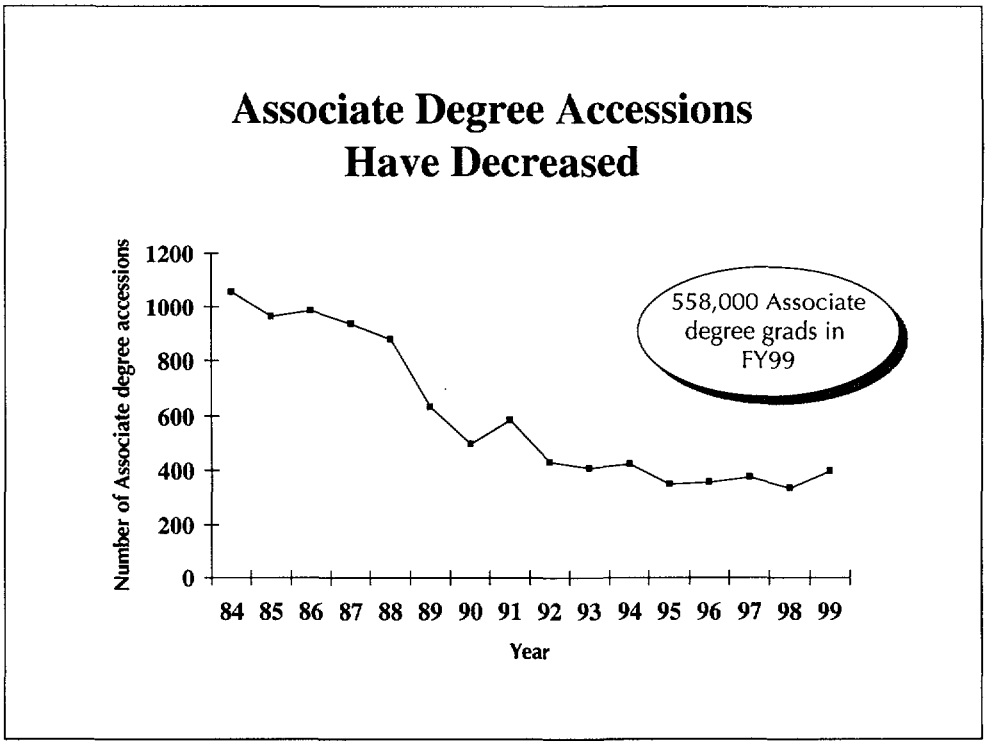
*The Enlisted Master File contains a variable to capture degree attainment, but this is changed only if a Sailor requests the change. Likewise, the Sailor Marine American Council on Education Registry Transcript (SMART) does not record degrees awarded; it records only recommended credits for Navy technical training and credits earned through TA or PACE.




Given the difficulties in pursuing voluntary education on active duty, we believe that the Navy must take the following steps to attract the college-bound and 2-year-college-graduate market: Create incentives and modify training to provide realistic opportunities for Sailors to earn degrees. Such changes would need to reduce or eliminate the requirement for Sailors to pursue voluntary education on their off-duty hours. As shown above, this means also expanding recruiting efforts and changing recruiting paradigms to include 2-year-college-bound high school graduates, who traditionally have either pursued 4-year-college degrees after graduating with Associate degrees or have entered the workforce.




In the next slides, we discuss three different phases of a 2-year-college-degree path, each with unique recruiting challenges and opportunities. The first one presented here is recruiting 2-year-college graduates. Some of these graduates have degrees in fields of study that have significant overlap with Navy training, such as electronics, information technology, construction trades (air conditioning and refrigeration, welding, electricians), and medical technicians. Depending on the degree of overlap with Navy training, these types of recruits have the potential to reduce a significant portion of Navy training, thereby saving training costs. For that reason, we call this option recruiting pretrained.




Recruiting 2-year-college graduates is not necessarily a new option, as this slide shows. In the mid-1980s, the Navy enlisted over 1,000 recruits with Associate degrees each year. However, while the number of Associate degree graduates has increased throughout the 1990s, the Navy has recruited fewer of these graduates each year. In FY99, the Navy recruited only around 400 recruits with Associate degrees* out of more than 500,000 graduates [7]. To put this number in perspective, the Navy recruited more than 43,000 people with high school degrees in FY99 from a pool of 800,000 non-college-bound high school graduates. Certainly, the two markets are not the same in terms of eligibility for recruitment or propensity to enlist. For instance, not all 2-year-college graduates are within recruitable age limits, and a larger percentage are married and/or have dependents compared to the high school market. Likewise, not all non-college-bound high school graduates are recruitable (e.g., because of low test scores or medical conditions). Nevertheless, the comparison is informative.

Regardless of the numbers of recruits accessed with college degrees, the Navy does not capitalize on their civilian-acquired skills. Past programs have been phased out (such as the Lateral Enlisted Accession Program (LEAP)), and the only current program—Direct Procurement of Enlisted Personnel (DPEP)—is applied only to recruiting morticians, for which no Navy training exists. Thus, DPEP is applied to just a few recruits each year.

*Source: CNA Enlisted Master File.

## FY96 Pretrained HM Experiment

- Goal of 75 for 2 NECs – lab technicians and radiographers
- Each recruit saved about 1 year of advanced training and $30,000
- But, only 30 were recruited
  - 1 year reduction in obligated service
  - No enlistment bonus
  - E3 upon accession

In FY96, CNA worked with CNRC and BuMed on an experiment in which community college graduates were recruited into the HM rating and awarded an NEC for their college education immediately following HM A-school, with no additional training. This experiment was conducted to help the Navy expand recruiting into the 2-year-college market, as well as to determine whether it was feasible to recruit pretrained community college graduates. We believed that recruiters might have more success breaking into the 2-year-college market if they targeted a specific type of recruit.

Two NECs were chosen: radiography and medical lab technician. These two were chosen because they had long training pipelines (about 1 year) and large Navy and civilian training requirements. In addition, their civilian starting salary was not significantly higher than the regular military compensation for an E3. On average, the differential was just a few thousand dollars, depending on the region of the country employed. This differential could have easily been compensated for in an enlistment bonus.

The estimated savings from recruiting these graduates was about $30,000 each, and is based primarily on the average enlisted programming rate for one year.

A goal of 75 recruits was established for the experiment, but only 30 were recruited in the year following the experiment. This experiment taught numerous lessons in terms of community college recruiting in general, and recruiting pretrained recruits in particular. Details of the experiment are described in [8]. For instance, it was clear that enlisted recruiters were neither familiar nor comfortable with recruiting in the

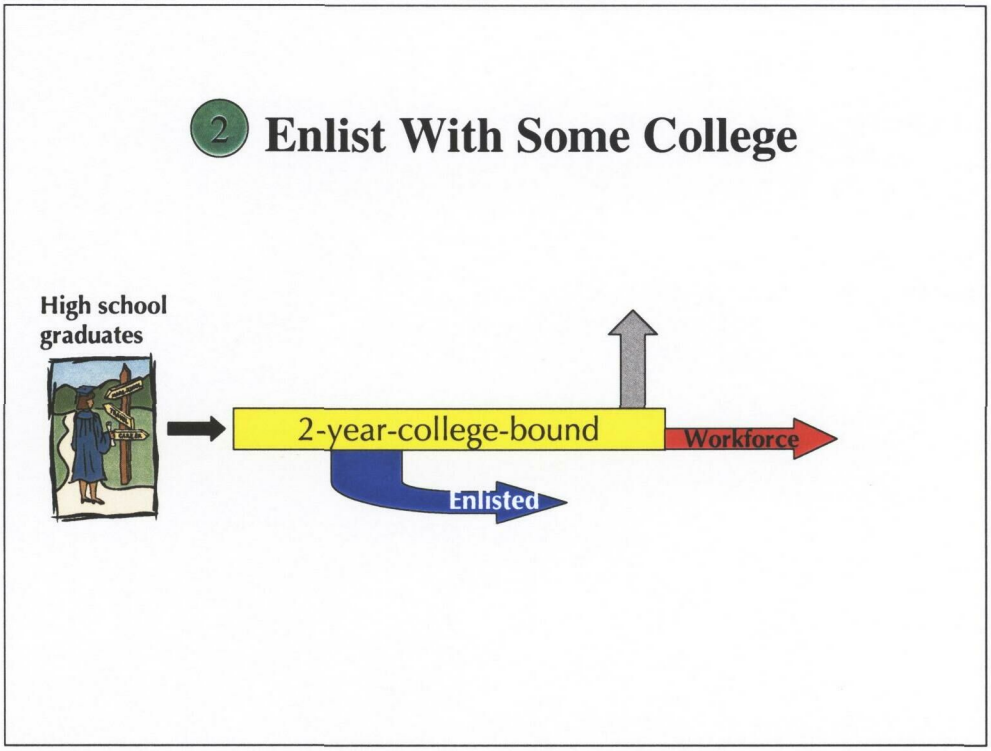
2-year-college market. Their training, senior enlisted leadership, and short-term recruiting goals all created practices and incentives that made it difficult to break out of the traditional market and venture into a new, but unknown, market. These difficulties exist regardless of whether the goal is to recruit pretrained graduates in targeted fields, or community college graduates in general. We learned important lessons in terms of recruiting pretrained recruits, who possess the skills and training that offer the Navy opportunities for saving training costs. For instance, the only incentive we were able to obtain was a 1-year reduction in obligated service (typically a 5-year obligation) because these recruits saved 1 year of Navy technical training.

One enlistment option that would have helped to make the Navy more attractive for these graduates was advanced paygrade upon accession, which not only confers higher pay but also more responsibility commensurate with their slightly higher age and maturity compared to the average HM recruit. Navy policy is to award E3 upon accession to any recruit who enters with at least 45 college semester hours, regardless of degree completion or compatibility with Navy training.* BuMed, however, would not approve an accession paygrade above E3 for these pretrained recruits because, at the time, promotion rates for HM to E4 were relatively low and BuMed feared that advancing new recruits over Sailors with years of service in the Navy would not be equitable. They also expressed concern that accession as a petty officer implied some management responsibilities that required Navy experience, which these recruits lacked.

Another incentive that would have helped is an enlistment bonus. Our request for a minimal bonus was denied, and we will discuss the reasons why in the last section of the paper, where we outline obstacles to recruiting from this market.

We have continued to work with CNRC personnel to promote recruiting from the 2-year-college market. As evidenced by the previous graph, these efforts have not produced an appreciable increase in the number of recruits with 2-year-college degrees. We will discuss some of the factors that contribute to this lack of success later.

*For instance, a 4-year-college dropout majoring in dance with 45 semester hours is eligible for E3, as is a recruit with 69 credits and an Associate degree in electronics.




An alternative to recruiting 2-year-college graduates is to recruit college students who have already completed some of their college degree before going on active duty. Ideally, the courses completed before enlisting would fulfill all of the college degree requirements that are not satisfied by Navy technical training, thereby ensuring that a Sailor can earn an Associate degree without any courses required during off-duty hours. For some ratings, this is not possible because the Navy technical training is not sufficiently extensive or comprehensive. But even for these ratings (mostly the less-technical ratings), the Sailor would be required to take only a minimal number of courses after going on active duty.

Rather than recruiting college dropouts, we believe that the best opportunity for successful recruiting from community college campuses is to work with the colleges in partnerships that promote the completion of a degree. By forming such partnerships, all parties work toward the goal of increasing enlistments of high-quality recruits because all parties benefit:

- Colleges gain by increasing graduation rates, which they depend on for part of their state and federal funding. By partnering with the Navy, the college provides students with alternatives to the traditional degree path. These alternatives may be attractive to some students who never considered pursuing a college degree or who, after starting a college program, find that they either lack the finances or commitment to continue.

- The students benefit because they do not have to pay tuition or forgo earnings for the entire 2 years of a college program. While in the Navy, they "earn while they learn." For students enrolled in public 2-year colleges, the largest expense is not tuition or room and board, but the "opportunity cost" of attending college. In other words, instead of attending college, a student could be employed full-time. Even at $6 per hour, this equates to more than $12,000 in lost earnings per year. This far exceeds the pecuniary costs of attending college.
- The Navy benefits by expanding recruiting to a high-quality market that has acquired excellent preparation to pursue high-tech training through college education.

As we noted, the key to a model in which the Navy recruits 2-year-college students before graduation is partnerships with colleges that create tailor-made Navy degree paths that maximize credit for Navy technical training, while satisfying the rigorous standards established for an Associate degree. The requirements for an Associate degree must be well established and well known to students before going on active duty, and even before beginning their college career, in order to take the prescribed courses and complete the degree while on active duty. The more technical the Navy rating, the more credits that can be awarded by the college for the training, and the fewer courses that are required to be taken either before going on active duty or after completion of Navy technical training.

While these partnerships are the cornerstone of such a program, they cannot be successful if the Navy does not make substantial changes in the way it assigns school guarantees before enlistment and while in boot camp. In other words, well before a recruit goes on active duty under such a program, he or she must be guaranteed a particular rating, and that guarantee cannot change (except for slight changes, such as from a surface YN to a submarine YN). This is currently not the standard operating procedure for recruiting programs, such as the nuclear field, the advanced electronics/computer field, or the submarine electronics/computer field, in which recruits are guaranteed only one of several ratings in the field before going on active duty. In addition, a significant number of new recruits are reclassified into a different rating while in boot camp. For recruits pursuing a particular degree under this type of college enlistment program, a change in rating could effectively mean the loss of a college degree.

Developing these partnerships with community colleges requires a significant commitment from both college and Navy personnel. The greatest expense to the Navy in these partnerships is time devoted by personnel to create the college agreements. Because degree requirements differ by state, and sometimes even by college, these partnerships need to be developed on a local level. While no national standard exists for college degrees, we describe in the next slide a federal program that exists that can help facilitate the formation of these partnerships.

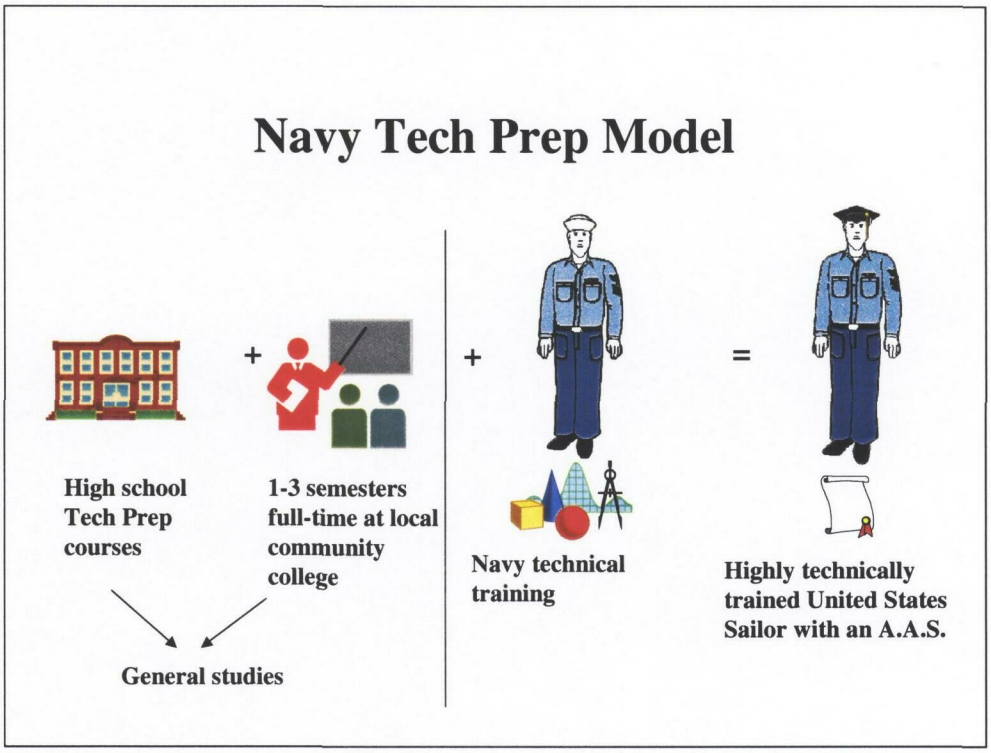
## Preservice College - Tech Prep

- Federally funded program to improve technical and academic skills of the "neglected majority"
- Secondary schools form partnerships with community colleges
- About 1 million students involved
- We estimate the potential for thousands of high-quality recruits

CNA has worked with CNRC for the past 3 years in developing partnerships with community colleges under the federal education program called Tech Prep. Tech Prep is part of the Carl D. Perkins Vocational and Applied Technical Education Act (PL 105-332) and is aimed at improving the academic and technical skills of high school students. Originally, the target was the "neglected majority," or the middle 50th percentile of students who traditionally either did not want, or were not able, to pursue a 4-year-college degree. These students were often provided little guidance or academic preparation to pursue a technical or vocational degree. Tech Prep was created to address that need.

The most common Tech Prep model is a partnership between a community college and the secondary school divisions within its service region, which forms a Tech Prep consortium. The consortium establishes programs in which high school students explore and pursue a technical career field. These programs are intended to include the last 2 years of high school, to lead to a 2-year-college degree or vocational certificate, and to result in technical job placement. For more details on the federal program and the Navy's initiatives, see [9].

Both enrollments in community colleges and participation in Tech Prep have grown significantly throughout the 1990s. We estimate that about 1 million high school students currently participate in Tech Prep and that this market has the potential for thousands of high-quality enlisted recruits. In fact, the Tech Prep model, outlined on the next slide, could be applied to any 2-year-college-bound high school student, whether or not the student was participating in Tech Prep. The Tech Prep program, however, provides additional framework and support from community colleges and state higher education to help build and recruit to the program.




This slide illustrates the basic Navy Tech Prep model that has been applied in articulation agreements signed with over 50 colleges. These articulation agreements all follow a fairly standard model: The agreements specify the college credits that will be awarded for Navy training based on recommendations from the American Council on Education (ACE). The colleges then formulate degree paths for those who will ultimately be trained in a particular rating, identifying additional courses that would be required over and above Navy technical training to earn an Associate degree. For some high school students, part of these requirements may be fulfilled while still in high school as part of a dual enrollment or articulation agreement with the partner community college. Upon high school graduation, the student enrolls full-time at the community college to complete the degree requirements that will not be fulfilled by Navy technical training. For more technical ratings, such as the nuclear field or the advanced electronics/computing field, this usually requires only one additional semester. These courses comprise mostly general education requirements and basic introductory theory that prepare the recruit for the rigors of advanced Navy technical training.

Upon completion of the college residency requirements, the student goes on active duty. After graduating from initial skills pipeline training, the Sailor applies for credit to the community college for this training, which satisfies all remaining degree requirements.

## Another Preservice College Incentive

- DEP loan/scholarship
- About $4,000 per semester
  - Cost of college has increased but scholarships have decreased
- Loan if requirements are not fulfilled—time in service, successful training
- Enticement to join in off-peak months

In our discussion of this college incentive so far, we have only noted the cost to the Navy in personnel time in creating the partnerships. We have assumed that the student pays for the college courses required before going on active duty. Such an incentive may be attractive to some college-bound high school students without any further incentive. If the Navy also funded the preservice college courses, however, this incentive might appeal to a wider market. Because of legislative prohibitions, no incentive exists to provide financial assistance to Navy enlisted recruits to pursue a college education before going on active duty. The Army is currently the only service able to provide funds to recruits in the Delayed Entry Program (DEP), under a new pilot program called Army College First. CNRC has submitted a proposal for a college DEP loan/scholarship incentive for all services as part of the FY03 Unified Legislative and Budgeting (ULB) process. This proposal is different from the Army College First program, and we believe that it has the potential to be more attractive if the offer is at the right level, as we will discuss.*

Under a Navy DEP college loan/scholarship program, the Navy would provide funding for a recruit in DEP in specified ratings or programs to pursue full-time college enrollment for up to two semesters. The Sailors would have to fulfill their obligated service commitment for the funding to be considered a scholarship. As the legislation is written, failure to complete obligated service would transform the funding into a loan, requiring repayment in full.

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*The Army College First program offers a monthly stipend of $150 as well as repayment of education loans after entry to service. The program is offered to high-quality youth (AFQT categories I-IIIA), who must either join DEP or serve in a drilling unit to be eligible for the program. Recruits who earn Associate degrees under this program enter the service at paygrade E4. The Army has not specified how they will address attrites from this program.

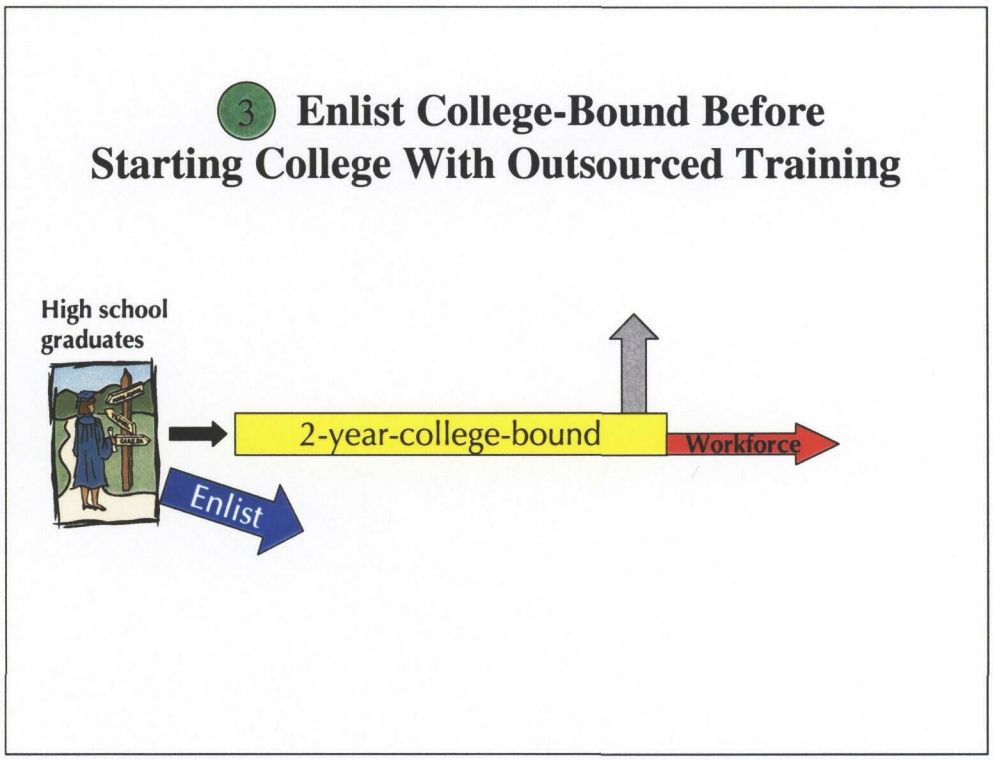
We believe that this would have particular appeal to the college-bound market because, while college enrollment rates have been on the increase, the financial burden of earning a college degree has also increased. For instance, the inflation-adjusted cost of tuition and fees at 4-year and 2-year public institutions have both increased 50 percent in the decade between 1990-1991 and 2000-2001. While total aid is higher, the greatest growth has been in loans that must be repaid. In 1980-1981, loans made up 40 percent of all aid, compared to 57 percent for 1999-2000 [10].

In considering what the right level of the incentive should be, the Navy should consider both the costs and benefits of such an incentive. In particular, here's how the Navy benefits:

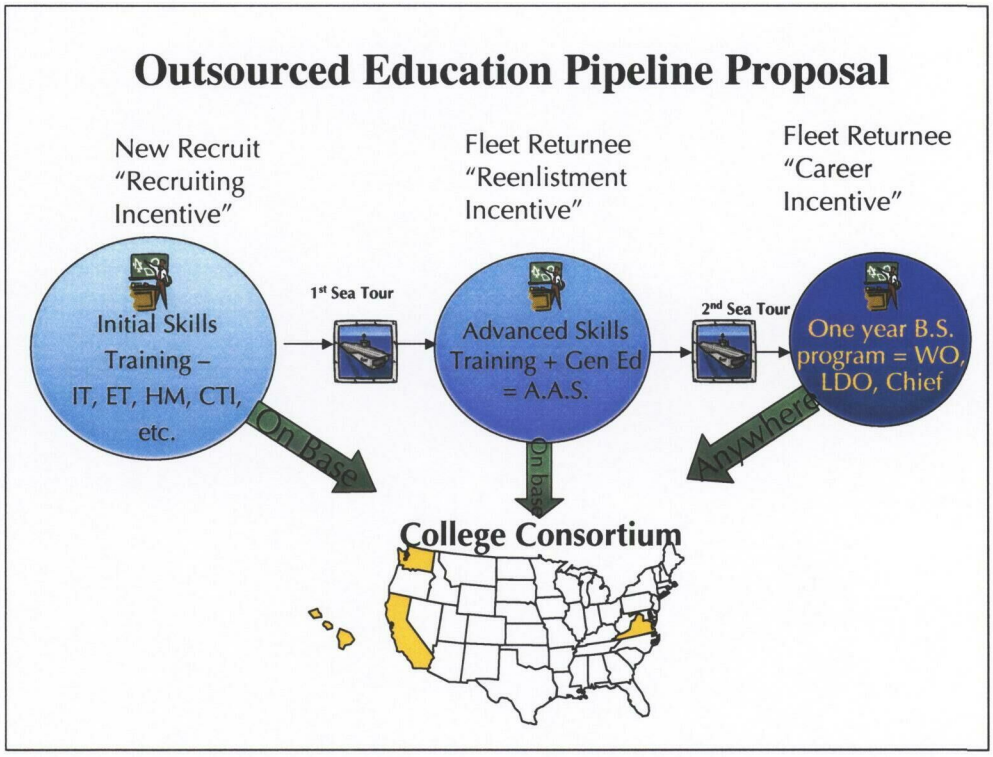
- It expands the pool of potential high-quality recruits. To attract large numbers of high-quality recruits into critical ratings, the Navy currently offers enlistment bonuses of up to $20,000.
- College courses improve the academic and technical preparation of recruits, which may reduce academic attrition, or allow for reduction in Navy technical training.
- The summer surge may be able to be reduced substantially if a significant number of high-quality high school graduates who have chosen to enlist immediately upon graduation can be encouraged to extend their time in the DEP until the winter in order to complete one semester of college. The cost of the summer surge is large.
- The cost of the incentive could be offset by a reduction in Tuition Assistance (TA) or PACE for a comparable number of courses for a Sailor while on active duty. It remains to be seen however, whether such an incentive encourages Sailors to pursue a greater number of courses while on active duty, which would actually increase the total cost of TA and/or PACE. However, as we outlined previously, investments in TA and PACE are cost-effective to the Navy, so the Navy benefits in either case.

The ULB as written does not specify the monetary amount to be awarded, but it is costed as if each recruit receiving the benefit would be reimbursed for tuition only (estimated to be approximately $1,800 per semester). We argue that the level of incentive should be set to cover not only tuition and fees, but room and board as well. If tuition were the only cost of college, far fewer students would incur student loans. In fact, a 1998 survey conducted by the American Association of Community Colleges and American College Testing (ACT) found that half of the students surveyed said that availability of financial aid was an important consideration in attending a community college; nearly one-third said they could not have attended without financial aid [11].

The total costs for board, transportation, and other expenses have been estimated by ACT to average $4,327 for 2-year public and $4,097 for 2-year private institutions, per year [12]. Factoring in the lost wages of those attending full-time, as we discussed previously, we propose that the Navy consider providing funding for this incentive around $4,000 per semester, and that this incentive should be in addition to, and not in lieu of, other incentives for which the recruit is qualified (such as an enlistment bonus and/or the Navy College Fund). A more comprehensive analysis of the cost benefit of this incentive is required.




The third option for tapping into the college-bound high school graduate market is to enlist graduates before they begin their college degree, but provide them with all of the necessary courses for a 2-year-college degree as part of their training requirements on active duty. We develop this option in the next slides.




We propose that the Navy partner with community colleges in Fleet Concentration Areas (FCAs) to form a consortium of partner colleges. These colleges would create tailor-made Associate degrees for particular Navy ratings, maximizing the credits for required training. In addition, the consortium would agree to have identical degrees, and accept all credits earned toward a degree from any of the consortium colleges. Upon completion of boot camp, the Sailor would be sent to one of these FCAs to begin his or her Navy initial skills training, which would be offered by faculty from the partner college, on Navy facilities. Sailors in these programs would be full-time college students attending courses in a compressed schedule—40 hours per week vice the 15 to 18 hours per week of the standard full-time college student—and earning full college credit. Where Navy-specific equipment or knowledge is necessary, the teaching could be shared by Navy instructors, but still provide full college credit. Depending on the timing and nature of the training, it may be reasonable to include some courses that are traditionally not considered essential to Navy training but could make better Sailors, such as a writing course, or AC/DC theory for all electronics-related ratings.

Upon completion of the initial skills training, the Sailor would then go on sea duty. Significant savings in Permanent Change of Station (PCS) costs could be realized if the Sailor was sent to initial training in the FCA where he/she will ultimately be stationed for a first fleet assignment.

As a reenlistment incentive, the Sailor would be offered the opportunity to complete an Associate degree on shore duty at one of the consortium colleges. This second phase of the degree would include advanced skill training required for one or more NECs, plus all remaining college degree requirements. Under a compressed schedule, it is possible to earn an entire Associate degree in about 12 months. The Navy may want to increase

the obligation of Sailors taking this option by 1 year to compensate for the additional time spent in active duty training, which would certainly exceed the additional time in non-Navy technical training. Or, the Navy may be able to reduce the Selective Reenlistment Bonus (SRB) offered to Sailors in these ratings in exchange for this incentive by an amount that exceeds the cost to the Navy to provide the additional courses.

As a third phase of this incentive, Sailors returning from their second sea tour and contemplating making the Navy a career may be encouraged to reenlist by the opportunity to pursue compressed Bachelor's degrees on their subsequent shore duty. This degree completion would probably require 1 year in full-time college training if it were related to the Associate degree major field of study. For instance, a Sailor earning an Associate in Applied Science in Information Systems Technology could conceivably earn a Bachelor's degree in Computer Science with 1 additional year of compressed study. Or an ET or FC could earn a Bachelor's in Electronics Engineering. As we suggest in this slide, this is the most feasible for ratings that have the greatest civilian overlap, such as the IT, ET, HM, and CTI ratings. But most ratings could also follow the same basic model.

## Tradeoffs in College Market

### Benefits

- Large untapped market
- High quality
- Lower attrition
- Potential to save training costs and reduce backlogs
  - More current with changing technology
- Increased retention

### Costs

- Quality costs more to recruit
- Outsourced instructors reduce instructor billets, recent fleet experience
- Potential reduction in military acculturation

In this brief, we have specified three different approaches to tapping into community colleges. All three share some common benefits and costs. The first set of benefits of this market concern the quality of the recruit. For instance, the college-bound market is a large, relatively untapped source of high-quality recruits—regardless of where in the college continuum they are. All are considered high school graduates by the Department of Defense policy (even high school dropouts who complete one semester of college are considered to be Tier 1 recruits), and those who enroll in college generally score higher on standardized tests. In addition, recruits who enter with a college degree and Sailors who pursue VolEd have lower attrition, while the latter group also has higher retention. A second type of benefit accrues from recruiting those who have acquired some or part of a college education, whereby the Navy may be able to save in their training costs by reducing the length of their training pipeline.

CNA recently conducted a study for N7 to determine whether it was feasible to outsource some Navy enlisted training to community colleges [13]. In that study, we concluded that community colleges have some distinct advantages that enable them to provide training that is more cost-effective than similar training provided by the Navy:

- Community colleges can spread fixed costs of training over a larger population, thereby reducing the average cost of training. This is particularly true for Navy courses that have a small throughput.
- State governments subsidize the cost of community college tuition.

- Community colleges have more flexibility in staffing because they can hire temporary or part-time instructors. When backlogs in training occur, it is difficult for the Navy to find instructors and/or facilities to handle what may sometimes be a short-term problem.
- Unlike the Navy, the college does not incur the cost to train instructors.
- Community colleges' partnerships with industry enable them to subsidize the cost of training, as well as to keep on the cutting edge of changing technology requirements.

Costs include those associated with outsourcing Navy training to civilian institutions. The magnitude of these costs depends in part on where the Navy chooses to locate the training (which also affects benefits). For instance, by locating Navy initial skills training at civilian institutions, the Navy can realize savings in infrastructure. However, there may be a loss of militarization if new recruits, fresh out of boot camp, are sent to nonmilitary locations for any significant training pipeline. While this is not a well-understood phenomenon, this concern was expressed by Navy training personnel in the course of our study. The alternative is to have college personnel provide the training on military facilities. The potential savings are much smaller, particularly if the training requires computers, electronics, or other civilian commerical-off-the-shelf (COTS) equipment that would have been provided by the college on their facilities without additional charge.

A concern related to the loss of militarization is the loss of instructor billets, which provide high-quality shore tours for fleet sailors. In addition to the benefit they add in providing recent fleet experience to their teaching, there is some evidence that instructor tours have a positive impact on retention and promotion. However, some part of the curriculum may still need to be provided by Sailors, side-by-side with civilian instructors, if Navy-specific knowledge is required.

Finally, in terms of recruiting pretrained college graduates, it is well known that quality costs more to recruit, but studies have only looked at the difference between high school dropouts and high school graduates—regardless of postsecondary training—in estimating the difference in costs. Presumably, recruits who enter with some postsecondary education would require greater compensation than high school graduates with no additional education. Some of these recruits would access as an E2 or E3, depending on the number of credits earned. This higher pay, in addition to any applicable bonus, may or may not be close to what they could earn in the civilian sector. This difference would depend on not only the career field but the geographic location of the recruit. Because bonuses are currently limited to $20,000 (by Congress), there may be some fields for which the Navy cannot adequately compensate pretrained recruits.

## Obstacles to Cultural Change

- Recruiting crisis
  - Focus is on immediate goal
- Training model
  - Assumption of unskilled recruits
- Compensation system
  - Higher pay is tied to higher rank
- Stovepipe funding
  - Skilled accessions are more expensive to recruit but cheaper to train

CNA has been directly involved with efforts related to each of the recommendations presented in this briefing, and we can cite numerous lessons learned from each. In this slide, we outline the major obstacles to implementing any of these recommendations and to changing the culture in general.

First, we understand and appreciate the immediate goals that recruiting faces. The mission has become increasingly more difficult and more expensive. Recruiters are too busy trying to secure recruits who can ship in a very short period of time to devote energy and resources (mostly time) to experiment in relatively unknown and untested markets—particularly those in which potential recruits are not available to ship immediately. In some cases, recruits must wait months to complete a semester, or even years until college graduation. Recruiters are in the markets they are incentivized to be in—by CNRC directly, and indirectly by all of the other Navy commands that depend on a certain number of recruits to show up at boot camp each day. Until the incentives change, recruiting will not change.

Second, the current Navy training model is too inflexible to be able to reap significant benefits from recruiting community college graduates. The HM experiment allowed for complete substitution of Navy for civilian training because the Navy training is accredited by the same civilian bodies that accredit the community colleges. Thus, the Navy was assured of a significant overlap in skills.

No mechanism exists, however, in which a recruit with an Associate degree in, say, electronics engineering technology or information systems technology, can have his or her skills and knowledge assessed and can be placed into a higher level of training than the entry-level pipeline training that all recruits must complete.* For this to happen, the Navy would need much more flexible training and assignment systems, in which training was broken down into numerous modules with multiple sections, and in which there were sufficient convenings of each module so that a recruit could start at any point in the training without having to spend valuable time awaiting instruction.

The third problem we have already noted—the inflexibility of the compensation system to provide for higher pay for new recruits with previously acquired skills, without assessing them at a higher paygrade. In fields where the differential between E3 pay and civilian starting salaries is greater than the $20,000 current cap on enlistment bonuses (such as electronics, health care, and computer-related occupations), the Navy will have the most difficulty in attracting pretrained recruits. In most of the fields, however, the cost to the Navy to comparably train these recruits far exceeds the differential in compensation, justifying even greater incentives. Accession at even higher paygrades is not necessarily the answer because paygrades imply greater skill but also greater Navy knowledge and experience, the latter of which new recruits do not possess. The issue is really that, without greater flexibility in the compensation system, lateral accessions are not practical.

Finally, inflexible stovepipe funding often makes it difficult to realize savings. For instance, the HM experiment was not a large success, in part, because the Navy would not provide an enlistment incentive to attract these pretrained recruits. Our request for a $3,000 enlistment bonus was denied, yet a $3,000 enlistment bonus to recruit someone who would save $30,000 in Navy training costs is cost-effective in an overall Navy perspective. However, those in charge of distributing limited enlistment bonus funds (Pers 22 in FY96) were not the beneficiaries of the training savings. (In this case, HM training is funded through DoD Defense Health Program funds, but indirectly BuMed would have benefited from the reduced cost in training.) In addition, neither CNRC nor Pers 22 felt that they could justify paying an enlistment bonus for recruits into a rating that has never suffered a recruiting shortfall.

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*The Advanced Electronics/Computing Field provides for some self-paced training, which allows those with civilian-acquired skills to accelerate their progress through the pipeline. However, no test exists to allow them to challenge out of an entire component of training.

## Recommendations

- Set aggressive short-term goals to energize recruiting and training establishments
  - 5% of accessions pretrained
  - Add 1 rating per year to the list of outsourced education pipelines
- Set long-term goals to align "educated Sailor" population to mirror civilian market – around 40%

We have argued in this briefing for the need for the CNO to make education a priority for the Navy. At that level, we believe that the best way to make such a cultural change is to set goals that are realistic but force Navy commands to alter the current way of doing business to realize those goals. For these goals to be achieved, the obstacles will have to be cleared and incentives aligned. To that end, we recommend the following:

- Set a goal of 5 percent of enlisted accessions to be in the category of "pretrained." We define pretrained to include those who access with either a college degree or part of a degree through Tech Prep or other partnership arrangement, or those who have completed at least one semester through the DEP scholarship/loan incentive. This goal should be increased incrementally throughout the CNO's tenure.
- Start with one rating that is completely trained through the outsourced pipeline model. (Perhaps the IT rating is the best to start with because of the significant civilian overlap and because of the lessons learned through the current IT University pilot project under way at Fleet Combat Training Center Atlantic.) Add one rating each year to this list.
- Currently, 22 percent of high school graduates enroll in a 2-year college, while 34 percent do not go to college right after high school graduation. If we consider this entire population to be comparable to the enlisted ranks (because the remaining high school graduates pursue 4-year-college degrees and mirror more closely the officer ranks), then 22 out of every 56 high school graduates, or close to 40 percent, are bound for 2-year colleges. We suggest that the CNO set a comparable goal for the Navy's enlisted ranks. In other words, the CNO should set a long-term goal of 40 percent of enlisted endstrength either accessing with some college or a 2-year degree, or working on or having earned a 2-year degree while on active duty.

# Backup Slides

# Navy Enlisted Education Policy

# Employment by Major Occupations

**Employment by Occupation 1998-2008**
(thousands of jobs)

| | 1998 | 2008 | Projected growth |
|---|---|---|---|
| Executive/managerial | 14,770 | 17,196 | 16.4% |
| Professional | 19,802 | 25,145 | 27.0% |
| Technicians | 4,949 | 6,048 | 22.2% |
| Marketing | 15,341 | 17,627 | 14.9% |
| Service | 22,548 | 26,401 | 17.1% |
| Admin support | 24,461 | 26,659 | 9.0% |
| Agriculture | 4,435 | 4,506 | 1.6% |
| Precision production | 15,619 | 16,871 | 8.0% |
| Operators/laborers | 18,588 | 20,341 | 9.4% |
| Total | 140,514 | 160,795 | 14.4% |

Source: [2].

The Department of Labor estimates that total employment will increase 14 percent between 1998 and 2008, from about 140 million to about 160 million jobs. This slide shows the distribution of employment by occupational categories and the growth rate between 1998 and 2008. Employment growth is not expected to be evenly distributed across occupations, with professionals and technical workers leading the way in growth. The vast majority of jobs in the fastest growing occupational area—professionals—requires at least a Bachelor's degree, and is the most similar in composition to the Navy's officer corps. The second fastest growing occupational area—technicians—is composed mostly of occupations that are the civilian equivalents to the Navy's critical enlisted ratings (the nuclear field, the advanced electronics/computing field, the submarine electronics/computing field, cryptologic technicians, etc.), and enlisted medical ratings.

The slowest growing occupations of the labor force include such "old economy" occupations as mechanics and construction trades (both in precision production) and agriculture.

This slide is a summary of major occupational groups and provides only large-scale insight as to the changing nature of the American economy. A closer look at a more detailed level of occupations shows that the fastest growing occupations, in terms of percentage increase in jobs, are primarily in the health care and computer-related fields. For instance, the five fastest growing occupations (each projected to increase by at least 75 percent) are in computer fields. Over half of the next 25 fastest growing occupations are in medical-related professions, with most of these requiring an Associate degree or postsecondary vocational training.

# Job Growth Projections by Education – 1998 to 2008

**Employment Projections by Education for 1998-2008**
(percentage distribution)

| | % of jobs 2008 | Projected job growth (%) |
|---|---|---|
| Bachelor's degree or higher | 15.3 | 23.2 |
| Bachelor's degree or higher plus work experience | 7.0 | 17.5 |
| Associate degree | 4.0 | 31.2 |
| Postsecondary vocational training | 3.2 | 14.3 |
| Work related experience in related occupation | 7.8 | 11.8 |
| Long-term on-the-job training | 9.1 | 8.7 |
| Moderate-term on-the-job training | 13.7 | 7.0 |
| Short-term on-the-job training | 39.0 | 13.7 |

Source: [2].

Occupations generally requiring an Associate degree are projected to grow 31 percent, which is faster than all other education categories. This slide outlines projected job growth by all categories of education. Consistent with the projections summarized above, the largest growth will occur in jobs requiring postsecondary education—with all categories of college degrees predicted to experience larger than average growth.

Currently, about two out of every three high school graduates enter college immediately after graduation. As we discussed in our brief to the CNO, this shift in the Navy's traditional enlisted market has had a negative impact on recruiting. We believe that the college enrollment rate of new high school graduates will continue to increase in response to this large growth in the demand for workers with college degrees. This trend will last at least through the next decade, and probably beyond, exacerbating further the recruiting difficulties. In response, the Navy will have to position itself to be able to attract a growing number of these college-bound, high-quality enlisted Sailors.* Our brief to the CNO contained several recommendations to that end.

* While we did not discuss officer recruiting in the brief to the CNO, the rapid growth in jobs requiring a Bachelor's degree or higher will most likely have a negative impact on officer recruiting as well, particularly in the IT and medical fields.

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# References


[1] Martha E. Koopman and Heidi L. W. Golding. *Optimal Manning and Technological Change,* Jul 1999 (CNA Research Memorandum 97-144)

[2] Douglas Braddock. "Occupational Employment Projections to 2008," *Monthly Labor Review,* Nov 1999, pp. 51-77

[3] U.S. Department of Education, National Center for Education Statistics. *Digest of Education Statistics 1999,* Table 388

[4] James L. Gasch. *Results From the February and June 1999 New Recruit Surveys,* Jan 2000 (CNA Annotated Briefing D0000206.A1)

[5] Federico E. Garcia, Ernest H. Joy, CAPT, USN, with David L. Reese. *Effectiveness of the Voluntary Education Program,* Apr 1998 (CNA Research Memorandum 98-40)

[6] DoD Voluntary Education Program Fact Sheets. Website voled.doded.mil/dantes/ver/index.htm

[7] U.S. Department of Education, National Center for Education Statistics. *Digest of Education Statistics 1999,* Table 244

[8] Peggy A. Golfin. *A Summary of Navy Recruiting Efforts in Community Colleges in FY 1997,* Mar 1998 (CNA Research Memorandum 97-139)

[9] Peggy A. Golfin and Darlene H. Blake. *Tech Prep and the U.S. Navy,* Jul 2000 (CNA Research Memorandum 399.A1)

[10] The College Board Trends in College Pricing 2000. Website www.collegeboard.org

[11] American College Testing (ACT) May 31, 1999, press release. Website: www.act.org/news/releases/1999/05-31-99.html

[12] The College Board Trends in College Pricing. Website: www.collegeboard.org/press/cost99.html/Trends_Pricing_1999.pdf

[13] Peggy A. Golfin, John D. White and Lisa A. Curtin, CDR, USN. *A Role for Community Colleges in Navy Training.* Mar 1998 (CNA Research Memorandum 97-97)

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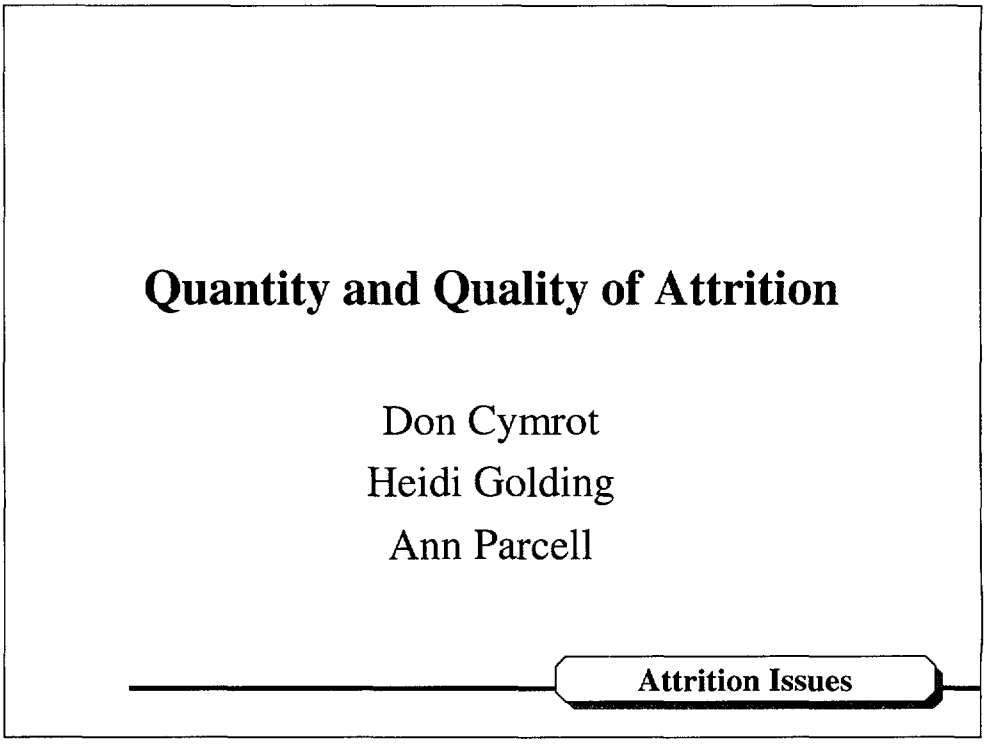
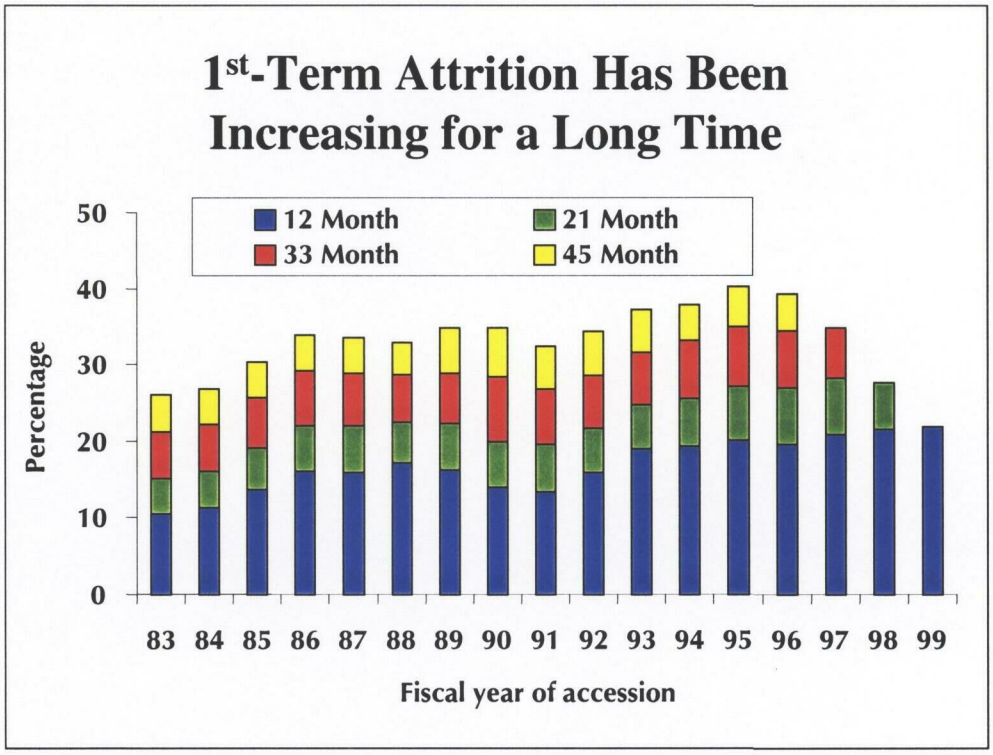



This briefing synthesizes a series of studies related to enlisted attrition done at CNA over the last few years. In addition to the authors, this briefing includes work by Aline Quester, Jerry Cox, Steve Belcher, and Jim Gasch.




Recently, the Navy has focused much attention on trends in attrition through the 1990s. However, a longer term perspective is important.

This slide shows the Navy's first-term attrition rate going back to FY83. The data are organized by entry cohort. Each bar in the graph follows all recruits who entered the Navy in a particular year with 4 or more years of initial obligation. Different-colored segments of each bar represent points in time in the career. We use 45 months as the end of the first term because some Sailors are permitted to leave the Navy up to 3 months before the end of their initial obligation "for the convenience of the government."

The most recent cohort to complete its first term of service is the group that entered in FY96. We include bars for the entry cohort of FY97 through FY99 to show their progress to date. Thus, our data actually follow Sailors through the end of FY00.

Important findings from this graph are as follows:

- Attrition has been increasing steadily for at least 15 years.
- Various efforts over time have met with some-short term success before the upward trend resumed.
- First-term attrition among the most recent cohorts hovers around 40 percent; that is, four of ten recruits do not even complete their initial obligation.
- The attrition rate of the cohorts currently in their first term appears likely to remain high.

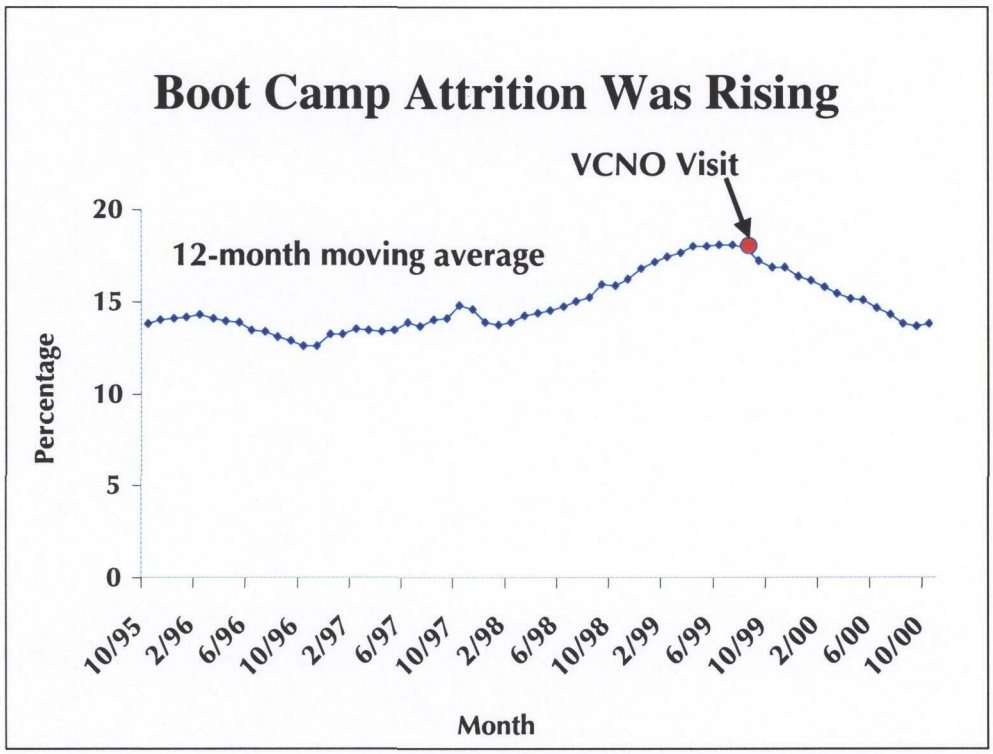
## An Overview of Attrition

- First-term attrition has risen in all phases (i.e., boot camp, schoolhouse training, fleet) until recently
- Leadership attention to the problem can be helpful
- New trend toward more losses among high-quality Sailors

Next we will examine the aggregate data in greater detail. First, we look at attrition through the different segments of the first term: boot camp, training after boot camp, and fleet assignments. We show that the increase in attrition is not the result of a problem in one segment of the first term; attrition had been on the rise in all phases of the first term and for a variety of reasons.

Our investigation suggests that one factor that can help reduce attrition is the involvement of the senior leadership. When the senior leadership highlights the difficulties of high attrition, deckplate leadership takes actions that result in lower attrition. We present evidence of the salutary effects of senior leadership attention on attrition.

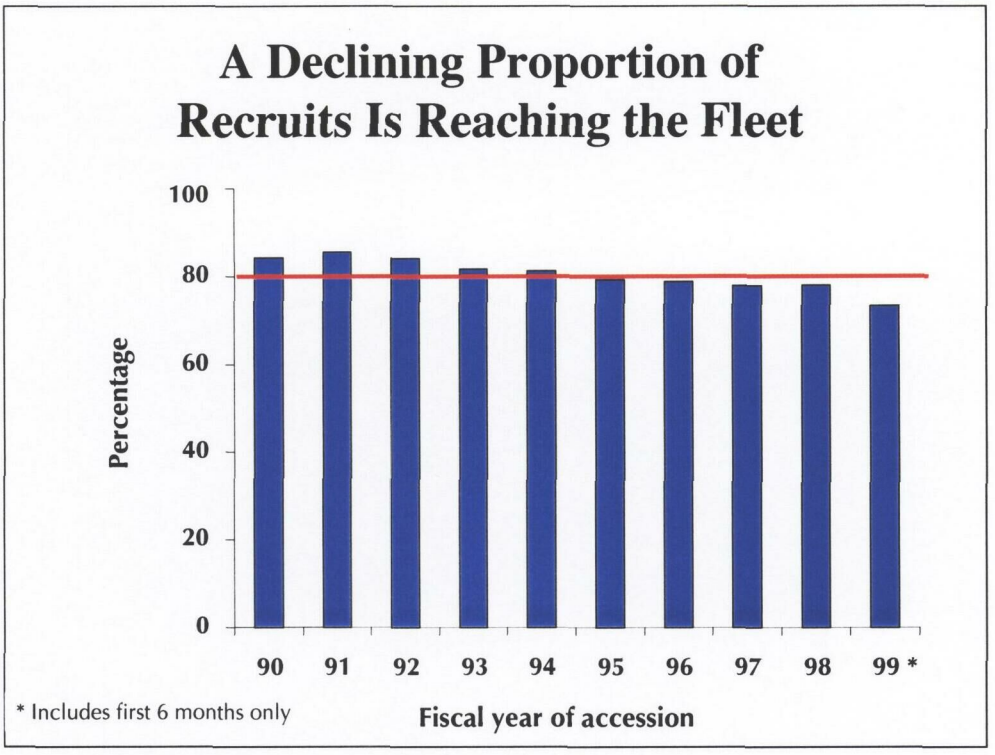
We then look at changes in the attrition rate by quality category. Perhaps the most disturbing aspect of the increase in attrition is that it is disproportionately large among the Navy's potentially best Sailors.




This slide shows the 12-month moving average for attrition from boot camp starting in the beginning of FY96. We use the 12-month moving average because this measure smoothes much of the month-to-month volatility in the attrition numbers. The 12-month moving average measures the attrition over the previous year. For example, the attrition rate for January 1999 captures the attrition behavior from the beginning of February 1998 through the end of January 1999. The rate for February 1999 will use the same monthly data as the rate for January 1999 except that it will replace February 1998 with February 1999.

This particular measure drew our attention to the attrition rate increase beginning in early FY98. By mid FY99, we became alarmed that the rate might actually exceed 20 percent by the end of the year. We briefed our finding to the Navy leadership up to Admiral Pilling (Vice Chief of Naval Operations).

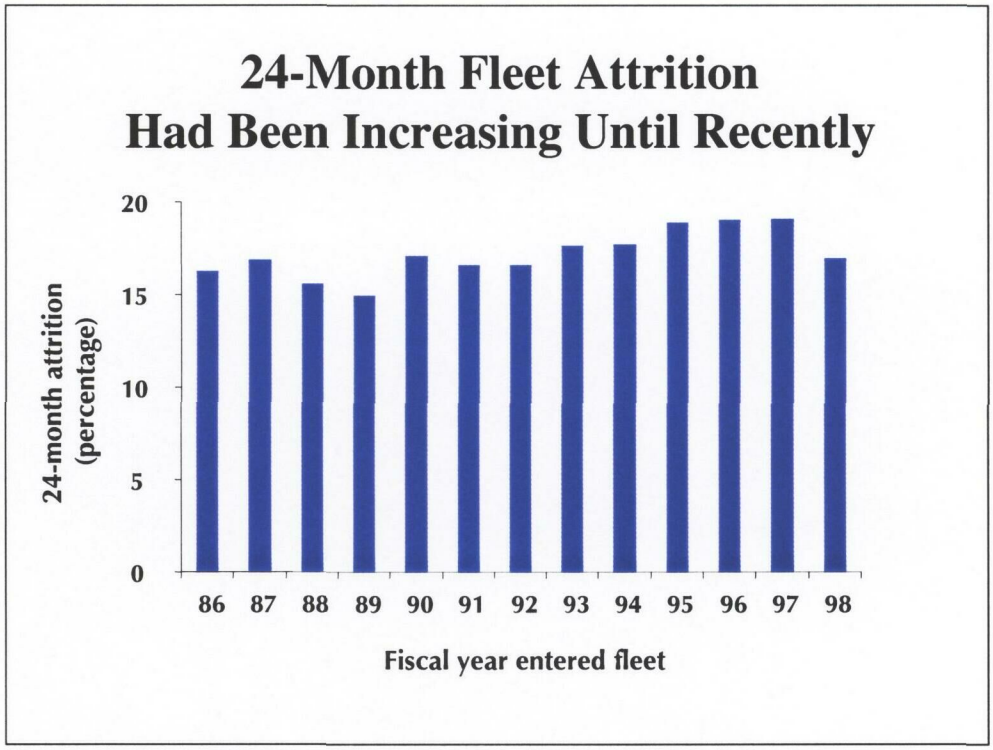
During the summer of 1999, the VCNO scheduled a trip to the Recruit Training Center at Great Lakes to better understand the dynamics of the attrition. As the VCNO's visit approached, boot camp attrition began to level out. By the month after the visit, the monthly attrition rate had fallen to around 11.3 percent (a drop of more than 5 percentage points in less than 2 months). Although the leadership at boot camp clearly deserves much credit for this decrease, it seems more than mere coincidence that the precipitous drop occurred around the time of the visit.




This graph shows early attrition from a slightly different perspective—through training—to measure the efficiency of the training system. Again tracking accession cohorts, we follow recruits through both boot camp and initial skills training to entry into the fleet. The fleet here means any assignment other than training. For example, a hospital corpsman's initial assignment to the Bethesda Naval Hospital represents a fleet assignment.

Note that recruits do not provide meaningful productivity to the Navy when they are in these training assignments. It is only after the recruit reaches a fleet assignment that the Navy starts to realize a return on its recruiting and training investment. The purpose of this graph is to show, at least by one metric, how the return on the Navy's investment in recruiting and training has changed over the decade.

The percentage of recruits reaching the fleet has been falling in recent years. In the early 1990s, the Navy lost about 17 or 18 percent of its recruits before the fleet assignment milestone. For the most recent cohorts, the attrition is around 23 percent. The graph actually provides the best case scenario for the latest cohorts. Some members of these entry cohorts are still in training; thus, they could not possibly have reached the fleet yet. The graph assumes that all those still in training will eventually reach a fleet assignment. If some of these in-training recruits fail to reach the fleet, an updated version of the graph will show an even larger drop in the percentage entering the fleet.




This graph is a natural follow-on to the previous graph because it tracks cohorts from the beginning of the first fleet assignment. Thus, we are counting only those recruits who successfully completed their initial skill training and have now entered the fleet. It then tracks these Sailors for the first 24 months of their initial fleet assignment. We consider Sailors who separate early from the Navy and leave their full-duty assignment before 24 months as 24-month fleet attrites. Time awaiting discharge (i.e., in a nonproductive billet) is not included toward the 24 months. Because we are tracking cohorts, the most recent cohort to complete the 24-month threshold entered the fleet sometime in FY98.

This graph shows the upward trend in attrition. In the late 1980s, the attrition rate hovered around 15 percent, but in recent years it had moved up to almost 19 percent. The most recent cohort's attrition has fallen almost 2 percentage points—an indicator that the Navy's attrition initiatives of the past few years may be working.

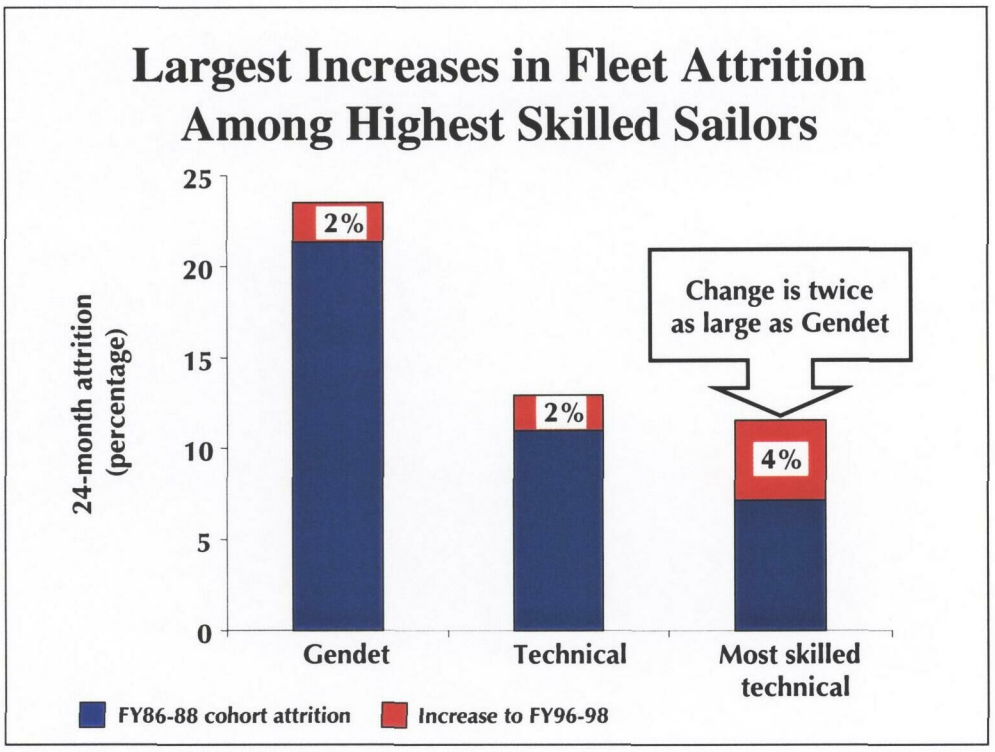
## The Quality Story

- Attrition of high-quality recruits less, but ...
  - Expensive to recruit
  - Expensive to train
- Attrition gap between quality and other Sailors is narrowing
  - Boot camp attrition of HSDG and high AFQT
  - Schoolhouse attrition of 6YOs
  - Fleet attrition for the highly trained Sailors

This briefing on attrition also considers the aspect of quality. Here, the term quality refers to the level of investment the Navy makes in people. Quality falls into two overlapping categories: those personnel who are the most expensive to recruit and those who spend the longest times in training. Navy Recruiting Command (CNRC) estimates that it makes the largest investment in recruits who have regular high school diplomas scoring in the upper half of the Armed Forces Qualification Test (AFQT) and spend time in the Delayed Entry Program (DEP).

Traditionally, recruits in the higher quality groups have the lowest attrition rates. Over time, however, the attrition gap between these higher quality recruits and all other recruits has been narrowing. The higher quality recruits still have an advantage—just not as much as in the past. For example:

- Recruits in FY94 through FY96 with HSDG, high AFQT, and DEP had a boot camp attrition rate of 9.8 percent. For FY98 accessions in this quality group, the boot camp attrition rate was 13.0 percent. In contrast, the attrition rates for the lowest quality cells—which top 25 percent—have barely changed.
- The percentage of 6YO recruits who left the Navy before reaching the fleet increased during the 1990s, rising from 12 percent for FY90 recruits to 18 percent for FY97 recruits.




This slide shows the narrowing attrition gap once Sailors have made it to the fleet. We compare fleet attrition rates among three groups: General Detail (Gendets), Technical, and Most Skilled Technical. Gendets receive only a few weeks of apprenticeship training after boot camp. The Technical group includes ratings with such descriptors as technician, electrician, mechanic, utilities and engineering, as well as both medical ratings. The Most Skilled Technical is a select subset of the Technical ratings. The group includes such ratings as aviation and electronics technicians. They are ratings with some of the longest training pipelines, and they afford some of the best civilian sector job opportunities.

The blue (lower) parts of the bar show the fleet attrition rates among these three groups from the baseline years 1986 to 1988. As expected, the attrition rates are correlated to the amount that the Navy invests in the Sailors in each category. So, Gendets, the least trained, have about three times the attrition rate as those Sailors in the Most Skilled Technical category.

The red (upper) parts of the bars show the increase in fleet attrition rates between the baseline years and the most recent cohorts (FY96 through FY98). Again, it is not surprising—given the increase in the aggregate trend—that the attrition rate is up in each category. What is troublesome, however, is that the increase among the most technically skilled Sailors is more than twice that of the Gendets.

## Reasons for Attrition Increases

- Civilian trends
  - Sustained good economy, low unemployment
  - Weakened sanction effect of less than honorable discharges
- Declining recruit quality
- Quality of service
- Sailors perceived as a free resource

This slide considers the causes of the increases shown in the previous section.

During the drawdown, the Navy was relatively rich in people. In general, strength was brought down at a slower rate than the fleet. It was easier to decommission ships than to reduce strength. Thus, it is not surprising that the standards for behavior may have increased. Many people talk about the "zero defect mentality" that arose during this period. Related to this are the incentives that ships' captains face. Although the captain is rewarded for the physical condition of the ship (e.g., SORTS and Battle E's), the work environment isn't. The only cost of attrition to the CO is the gapped billet; attrition statistics are not a factor in evaluating the ship or CO.

Another factor in the attrition increase may have been the strength of the economy. The unemployment rate has been trending downward for most of the last 15+ years. A strong economy means that the risk of losing a Navy job is reduced because jobs in the civilian economy are plentiful. In the past, it has been difficult to find good statistical evidence of the relationship between lower unemployment and attrition in either the Navy or the civilian economy. Historical studies of the civilian economy do not find that job turnover rates depend strongly on the economy.* Recent work at CNA does provide some evidence that part of the increase in attrition might be attributed to the strength of the economy.

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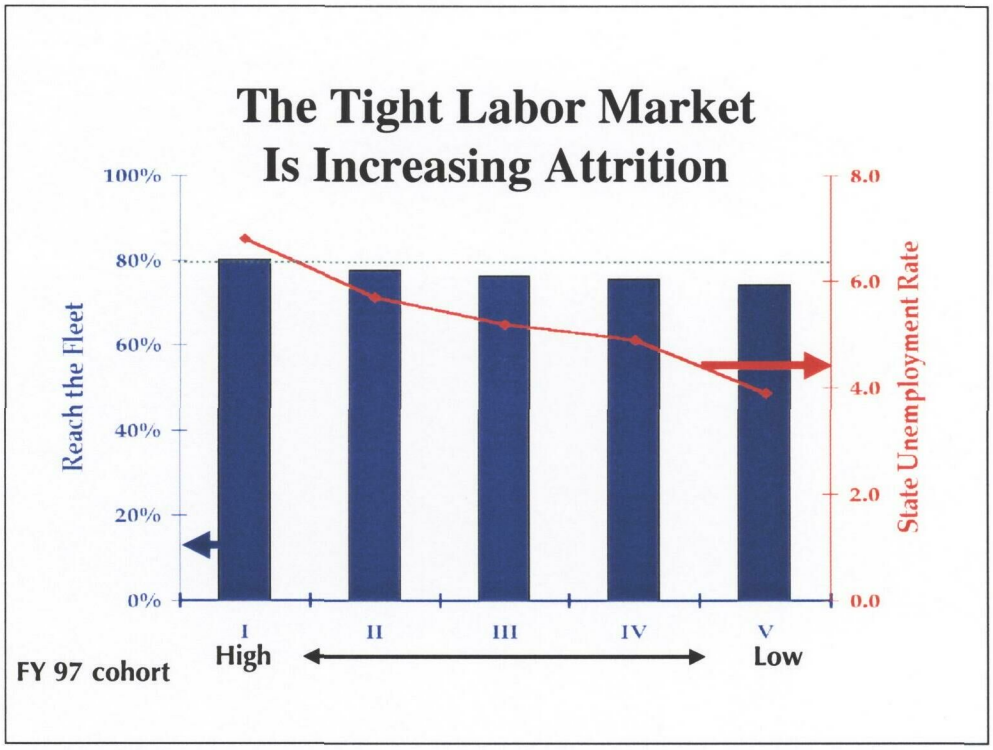
* Journal of Labor Economics, October 1999, Vol. 17, No. 4, Part 2.

There may also be a smaller detrimental effect of "less than honorable" discharges on the future employment opportunities for Navy attrites. There are at least three explanations for this reduced sanction effect. First, in our litigious society, fewer people are willing to give critical recommendations about former employees. As a result, employers are relying less on past employment histories to make hiring decisions. Second, in the face of labor shortages, employers might be willing to overlook more bad marks on a prospective employee's record. Third, with the declining veteran population, fewer employers are familiar with the military discharge system so that a general discharge, for instance, might not seem different from an honorable discharge.




As the civilian economy improves, Sailors may see the civilian economy as a lure and be more likely to attrite. In addition, potential recruits with the best civilian opportunities may become increasingly difficult to attract into the Navy, thus changing the mix of recruits. This change could increase or decrease attrition. For example, minority groups have lower attrition rates. If the improving economy increases (decreases) minority representation among the newer recruit cohorts, other things equal, attrition would decline (increase).

CNA has looked at the difference in attrition rates across recruits from different states. The thinking behind this analysis is that relatively new recruits are most likely to return to their hometowns if they attrite from the Navy. This chart breaks recruits into five state groups based on the unemployment rate in that state in 1997. Group I on the chart represents those states with the highest average unemployment rate (about 7 percent). Each successive group (II through V) has lower unemployment rates. The red line shows the decline in the unemployment rate. We then tracked the recruits through boot camp and initial skill training. The blue bars represent the percentage of recruits from a particular grouping of states who make it to the fleet. In 1997, slightly over 80 percent of recruits from the states with the highest unemployment rates remained in the Navy through their initial training phase. In contrast, only about 74 percent of recruits from states with the lowest unemployment rate made it through training and to the fleet.

Analyzing each year from FY94 to FY98, we find that the differential in the percentage of recruits completing initial training between the high- and low-unemployment states gets larger as the overall U.S. employment rate falls. This finding suggests that very low unemployment may be imposing an increasing cost (in terms of attrition) on the Navy.

The understanding used to be that a strong civilian economy increases the cost of retention at the reenlistment point. These findings indicate that the retention battle is not episodic but continuous.

## Quality-of-Service-at-Sea Focus Groups

- Disappointing port calls
  - Fewer foreign ports with more restrictions
- Increased workload
  - Shortage of Gendets and low manning are forcing Sailors to work outside their ratings
- Poor living conditions
  - Sailors can't "go home" at sea
- No time to study
  - Voluntary education is a low priority

For an ongoing study on fleet attrition, CNA researchers surveyed the fleet regarding their perceptions of the causes of fleet attrition, the ease in separating, and the effectiveness of Navy initiatives to reduce attrition. CNA interviewed manpower specialists and ship CO/XOs and conducted over 30 focus groups in FY99 and FY00. The focus group participants included primarily first-term enlisted Sailors serving on carriers, submarines, supply ships, and other platforms in Pearl Harbor, San Diego, Earle, and Norfolk. The interviews and focus groups confirmed the trends in the data and provided information on factors affecting attrition that are hard to quantify statistically, such as personal factors, the role of the work environment, and enjoyment of Navy life.

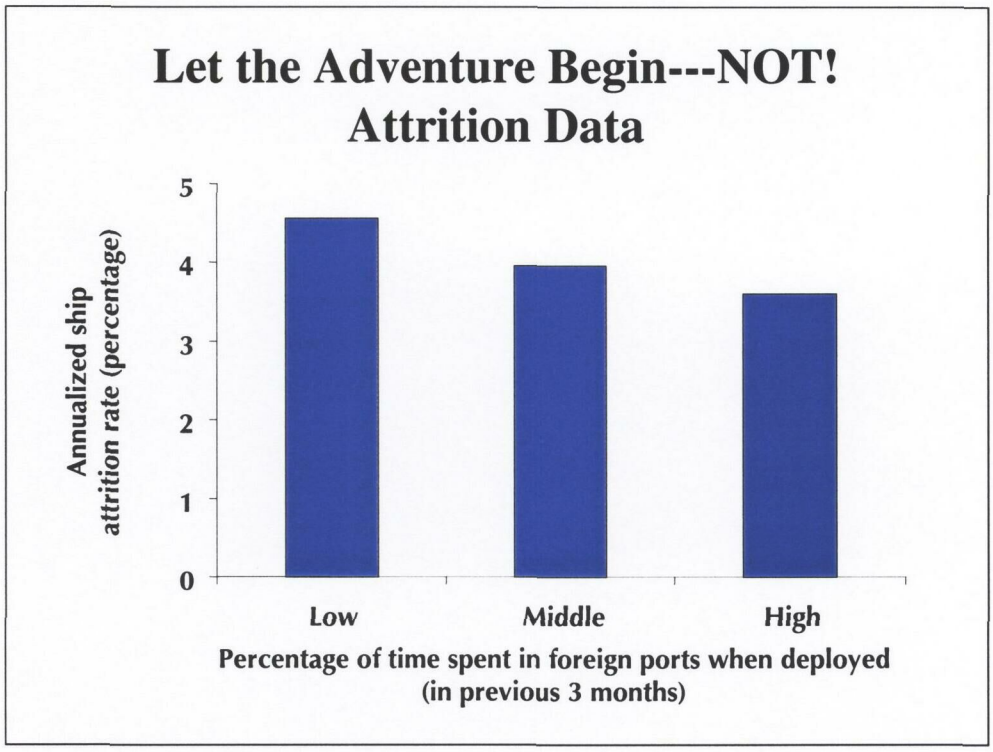
Three common sets of concern that Sailors felt contributed to attrition emerged in the focus groups: (1) sea duty, (2) leadership, and (3) compensation. We categorized Sailors' responses on the issue of poor quality of service at sea into the four themes shown on this slide. The primary issue cited by the junior Sailors had to do with adventure and travel. They claimed that there are fewer exciting ports of call than in the past and fewer than they expected—some ports being particularly undesirable. In addition, many ports are working ports in which they may have little or no liberty. Even when liberty is given, there are often restrictions (e.g., no overnight leave or the buddy system).

Sailors also cite increases in workload, unnecessary workload, and work outside their ratings as causes for higher attrition. For example, Gendet shortages affect both Gendets and rated Sailors. The shortages cause higher workloads for Gendets and less opportunity to "strike" for a rating. In addition, rated Sailors must complete more, and generally undesirable, temporary assignments to food service, laundry, and compartment cleaning than in previous years.

Although junior Sailors have traditionally had shipboard berthing, satisfaction with living aboard ship is low and may contribute to attrition. Issues that Sailors cited ranged from the lack of privacy and overall habitability to being called to work during off-hours.

Finally, most Sailors said they joined the Navy at least partly to get further education. However, workload precludes voluntary education and, typically, there is little time to study. Other impediments to participating in voluntary education included limited access to computers, transportation problems, lack of pierside training facilities, and lack of flexibility in work schedules for classes.

Finally, Sailors consistently stated that both senior and deckplate leadership can and do significantly influence quality of service aboard ship.



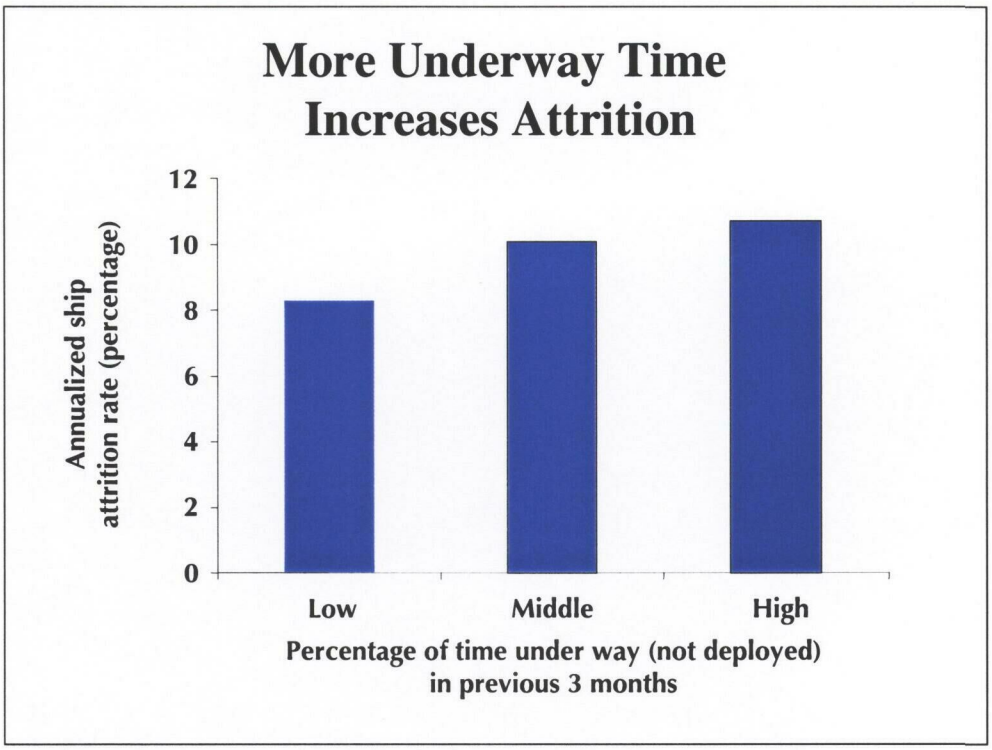

To test the relationship between attrition and the quality of service at sea, CNA analyzed ships' attrition rates. We merged individual ship data with Sailor data for FY97 through FY99 to obtain monthly information on attrition from ships. In this slide, we examine the relationship between ports of call and zone A attrition (LOS 0 through 6). Because we expect attrition to depend on what happened in the recent past, we compare the percentage of time a deployed ship spent in foreign ports in the previous 3 months to its attrition rate in the following month.

The data confirm that the deployment schedule of the recent past influences junior attrition. Ships spending a low fraction of previous 3-months' deployment in foreign ports of call experience higher rates of attrition among junior Sailors—an average annualized rate of 4.6 percent. This compares to only 3.6 percent for ships with a high fraction of time in foreign ports.

This chart breaks down the ship-months by the proportion of deployed time the ship spent in foreign ports of call in the previous 3 months. The Low category includes the 20 percent of monthly ship-months with the lowest percentage of the previous 3 months in foreign ports. None of the ships in this group spent over 12 percent of their deployed time in foreign ports. The ships in each successive group have increasingly higher percentages of time spent in ports of call. The Middle category includes ships with 12 to 33 percent of the previous 3 months spent in ports of call. The High category includes the 20 percent of ship-months with the most time in ports of call; each spent at least 33 percent of the previous 3 months in ports of call.

Because we track ships for several months at a time, over 3 years, ships are represented more than once. Over the period, the deployment schedule of a given ship varies. Thus, a ship may be in the High group for one 3-month period and in the Low group for another.

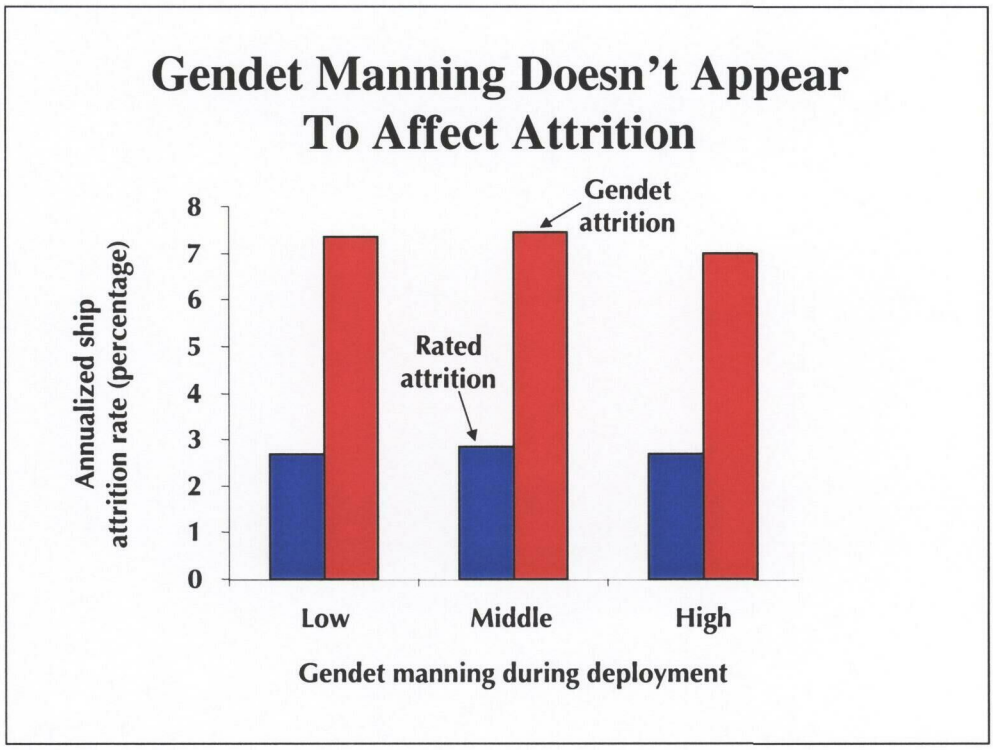
These data include only surface ships with BA of at least 50; smaller ships tend to have nontypical deployment histories and highly variable rates of attrition.




Because Sailors told us that both preparing for and going under way is arduous, we looked at the correlation between a ship's time under way (not deployed) and its attrition rate.

We used the same methodology as described in the previous slide to group the monthly ship data but include only those monthly observations for ships that had not been deployed for the previous 3 months. Here, the Low category includes the 20 percent of ship observations with the lowest percentage of time under way while not deployed in the previous 3 months. These ships had all spent less than 2.5 percent of time under way. The High group experienced more than one-third of its nondeployed time in the past 3 months under way. Ships in the Middle group were under way between 2.5 percent and 33 percent of their nondeployed time. The median was 19 percent.

Although the highest attrition does occur for ships with the most time under way, it is the movement from little time under way to the Middle group where the jump in attrition occurs.




This slide shows the relationship between Gendet manning and zone A attrition during deployments using the same methodology and sample as described previously. Despite the Sailors' complaints in focus groups, we did not find that lower Gendet manning was associated with higher attrition for either Gendets or for rated Sailors during a deployment.

Ongoing CNA research will provide additional statistical evidence of the relationship between ship employment characteristics and early fleet attrition.

## What To Do?

- Set an aggressive goal for attrition reduction (e.g., under 30% within your CNO term)
- Increase accountability for attrition
  - Require uniform reporting from local commands Navy-wide and reward the best
  - Include attrition control in FitReps of officers and senior enlisted
  - Penalize units with excess attrition with lower requisition priorities

We recognize that senior leadership will have to turn its attention to other problems, particularly if attrition declines from its historic highs. Therefore, we concentrate on how the Navy can change its system so that the attrition issue remains important at lower levels in the command structure, even when the senior leadership is focused on other issues.

We have organized our suggestions/recommendations into three categories. The first, shown here, includes ideas aimed at improving incentives and accountability within the system to reduce attrition. The second, shown on the next slide, deals with steps the Navy can take to improve the Sailors' quality of service. We conclude with some additional recommendations.

Our first suggestion is that senior leadership demonstrate that reducing attrition is a top priority by defining an aggressive attrition goal—one that is widely disseminated and translated into goals at the command level. [Note: The CNO adopted this recommendation at the All Flag Officer Conference in February 2001.]

Our other suggestions also involve raising attrition concerns on a much more regular basis at the local levels. Tracking attrition at the local level and providing context are important first steps, giving commands the information they need to determine whether they have a problem. Of course, such reports need to be viewed carefully because not all commands face an equal challenge in combating attrition. For example, attrition rates vary during the deployment cycle and by crew composition. Adjusting rates for the deployment cycle and tracking changes in attrition over a CO's tour could avoid some of the difficulties in interpreting attrition rates.

Finally, aligning incentives for ship commanders to reduce attrition is important. Except indirectly through the level of gapped billets and personnel readiness, ships' captains do not receive any benefits nor do they pay the costs for the attrition the ship experiences. Ideally, operating units would be required to pay the full cost of replacing an attriting Sailor. The problem with this ideal is that ships have very few discretionary funds. Alternatively, a fine can be imposed in the requisition system. Ships that lose sailors early would not be given high priority for replacement. This approach would not require deployers to sail undermanned, but rather would shift the burden for replacing the Sailors from the central distribution system to the local MCA or even squadron. If the CO's reporting senior is required to fix this problem, the CO is more likely to feel the consequences in FitReps and other evaluations.

## Improving Quality of Service

- Define and measure metrics and require regular reporting on progress
- Include a formal voice in the PPBS process (e.g., IWARs, BAM, Post-SPP Assessment)
- Consider early in the acquisition process
- Give local commands some discretion in managing Perstempo rules

Our second set of suggestions deals with issues of the quality of work life. Given the work schedule of most Sailors, they spend far more time at work or in a working environment (i.e., on a ship) than in any other activity. Improving the environment at work might be one way to improve morale and reduce attrition. One fundamental problem is that no one has historically had overall responsibility for quality of work life in the Navy. So, in the PPBS process, no one has done an overall assessment of the quality-of-work-life program. As a result, the Navy may be systematically underinvesting in this area. Improving the visibility within the PPBS system may be one way to address this investment issue. Some recent changes in the system, such as a new Baseline Assessment Memorandum (BAM) for quality of service, hold promise for improvement in this area. The idea of giving local commanders more discretion in managing Perstempo aligns policy with responsibility. If local commands are to be held responsible for its attrition, they should be allowed, for instance, to make tradeoffs between the morale effects of adhering to a 180-day deployment versus a few extra days to make port calls during the return transit. [Note: The CNO has adopted this idea in a recent message.]

## Other Initiatives

- Consider financial/other incentives to encourage completion of service obligation
  - "Completion" pay (e.g., at boot camp pay)
  - Extension bonus to smooth out summer surge
  - Outsourced pipeline training
- Support Personnel Task Force Experiments
  - Allows for more local discretion in establishing HR management systems

Here are some final ideas. Our first suggestion is to reconfigure the pay of new recruits to provide a reward for completion of boot camp. Because recruits have little opportunity to spend money during boot camp, the pay for the first 8 weeks of boot camp could be reduced to a minimal level. Then the difference between the current pay and this new minimal pay level could be shifted to a one-time "bonus" for completion of boot camp. Such a system would reduce the total payments to attrites.

Completion pays could also be awarded at other places in the career. The only completion pay that we are aware of currently in use in the Navy is the enlistment bonus. A recruit receives an enlistment bonus only upon completion of initial skill training. CNA is undertaking a study to determine whether these incentives actually reduce attrition both in initial skill training and in the fleet. If the results of this study are promising, perhaps such incentives could be expanded.

There is one caveat for this approach. We usually argue that a dollar received today has a greater effect on behavior than one deferred into the future. Thus, selective reenlistment bonuses are frontloaded. A dollar of completion pay is likely to have less of an effect on reenlistment or immediate action, but a greater effect on the long-term behavior. A more complete analysis of the costs and benefits of this approach would be useful.

The final bullet simply suggests identifying some ideas from outside the Navy or even outside the government, and then determining whether they are applicable to the circumstances of the Navy.

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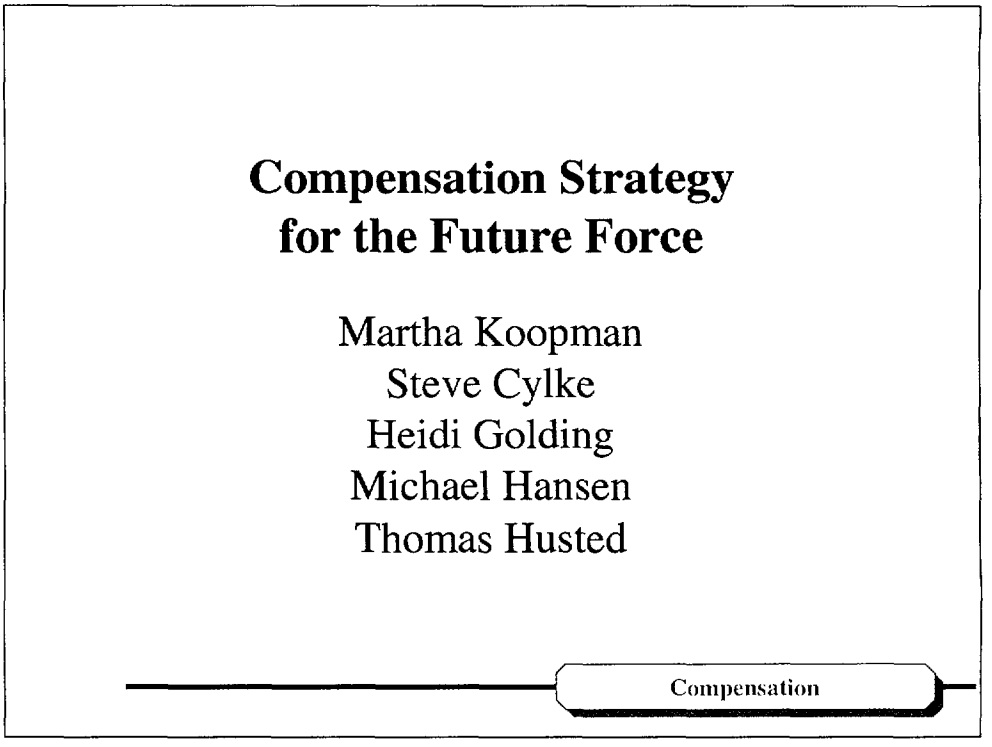



The Assistant Deputy Chief of Naval Operations, Manpower and Personnel (N1B) requested that CNA analyze the Navy's compensation system in view of current recruiting and manning shortfalls and anticipated future changes in the Navy's workforce. We proceeded by taking a strategic look at Navy compensation policy and practices.

To begin, we considered what the Navy wants to accomplish with its compensation system. We looked at human resource management system approaches, as well as economics literature, to arrive at a succinct set of strategic goals. The results 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.

In this briefing, after giving a short background on pay, we will do the following:

- Establish that compensation problems are already reaching crisis proportions.
- Explain why these problems are likely to grow worse in the future.
- Outline a strategic framework for a compensation system and see how the current compensation system measures up.
- Propose a direction for reform and describe the need for tests of market-based pays.

# Background

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 [1-6].

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 components 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.

Another 7 percent of the Navy compensation budget falls into other nondiscretionary categories as separation payments, PCS travel, clothing allowance, and other military personnel costs. This leaves 7 percent of the budget in categories that DoD calls discretionary. In the truest sense, a discretionary pay could be varied in order to meet the Navy's strategic pay goals. The DoD categories, however, are an assortment of pays that wouldn't all satisfy this definition. 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.

We are far from the first researchers or policy-makers to think about how to improve military compensation. Some common themes emerge throughout the many 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 [1, 2, 3].

Other widely discussed problems stem from the relatively small amount of discretionary pay available to support such goals as attracting and retaining people in occupations with high civilian pay, rewarding performance, and filling hard-to-fill billets. In addition, the military retirement system and the complicated allowance systems have come in for frequent criticism. Reference [7] summarizes some of the findings of other studies and their suggestions for compensation reform.

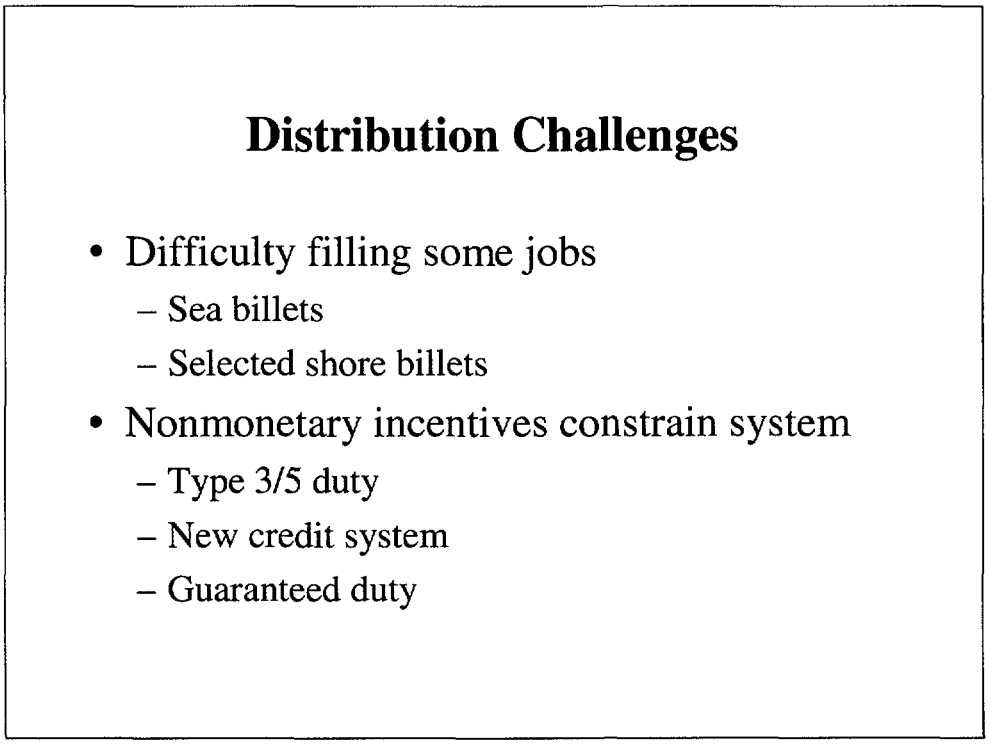
## Motivation

- Military faces difficult manning challenges right now
  - Difficulty getting people to "volunteer" for some assignments
  - Severe manning shortfalls in high-tech ratings
- Future trends will make these problems even worse
- Greater flexibility will be required
  - In compensation
  - In career paths

The military is facing problems with allocating people across jobs and providing sufficient skill differentials. We will show how compensation reform could help solve these problems. In addition, the complexity and rigidity of the compensation system and the incentive structure implicit in some traditional pays create challenges.

The following slides will document current problems with distribution and manning high-tech ratings. After that, we will discuss how future changes in military technology and youth demographics will exacerbate current problems.

Throughout our discussion of shortcomings in the compensation system and the resulting manning problems, we will see a common theme—the need for greater flexibility in compensation and in career paths. Increased ability to adapt to a dynamic environment would fix many of the problems associated with current pay structures.




The Navy is facing major difficulties in assigning and distributing its people. In particular, the Navy has recently devoted enormous efforts to reducing manning shortages or billet gaps in sea billets. In addition, selected shore billets, such as recruiting, some overseas locations, and some undesirable U.S. locations, have chronic manning problems.

In the past, the military has relied primarily on nonmonetary incentives to alleviate these shortages. These nonmonetary incentives, however, can constrain the distribution system and further exacerbate other manning shortages.

In particular, the use of sea duty credit for some overseas shore billets and neutral duty billets may help fill these billets, but even fewer people would be available for true sea billets.

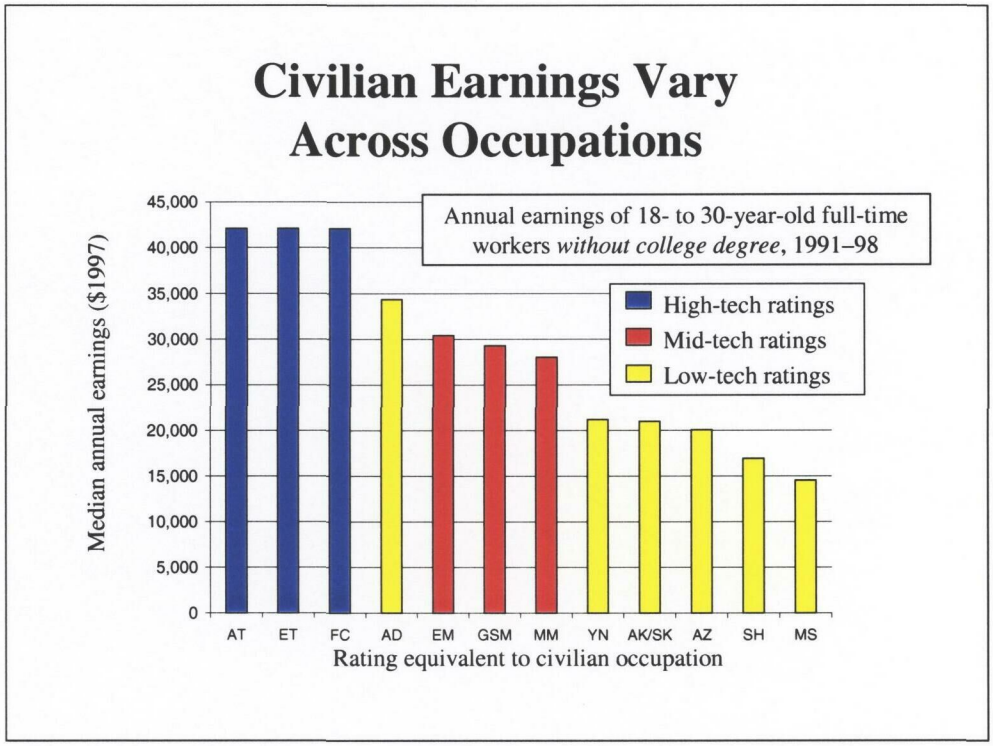
## Involuntary Assignments Have Consequences

- Sailor dissatisfaction with job
  - Lower retention
  - Difficulty recruiting
  - Lower readiness
- Geographic instability: rotation to "share the pain"
  - Family disruption, loss of spouse income
  - Lower readiness due to high crew turnover
  - High costs for PCS, transients, retraining

Distribution problems result at least partially from 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.
- Nonmonetary 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 cost-of-living adjustments (COLAs) compensate for differences in price levels, but not for other amenities or disamenities associated with certain overseas duty stations.

Ultimately, involuntary assignments affect retention because Sailors are forced to move frequently and sometimes to go where they are least inclined to go.




The next three slides summarize our case that insufficient occupational differentials cause manning shortfalls in critical, highly technical enlisted occupations. Complete details of this analysis are in [7].

This slide presents data on the private-sector earnings opportunities available to enlisted personnel in selected ratings. We matched Navy ratings to equivalent civilian occupations in the Current Population Survey (CPS). 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.*

We have divided the selected Navy ratings into three categories based on the length of their A-school training pipelines. The ratings we designate as high-tech spend over 200 days in A-school (plus usually some C-school), mid-tech spend 60-160 days in A-school, and low-tech ratings spend under 50 days in A-school.

In general, the chart shows that ratings requiring more training days and more technical skills have civilian counterparts with higher annual earnings. Furthermore, civilian earnings opportunities vary substantially from one occupation to the next.

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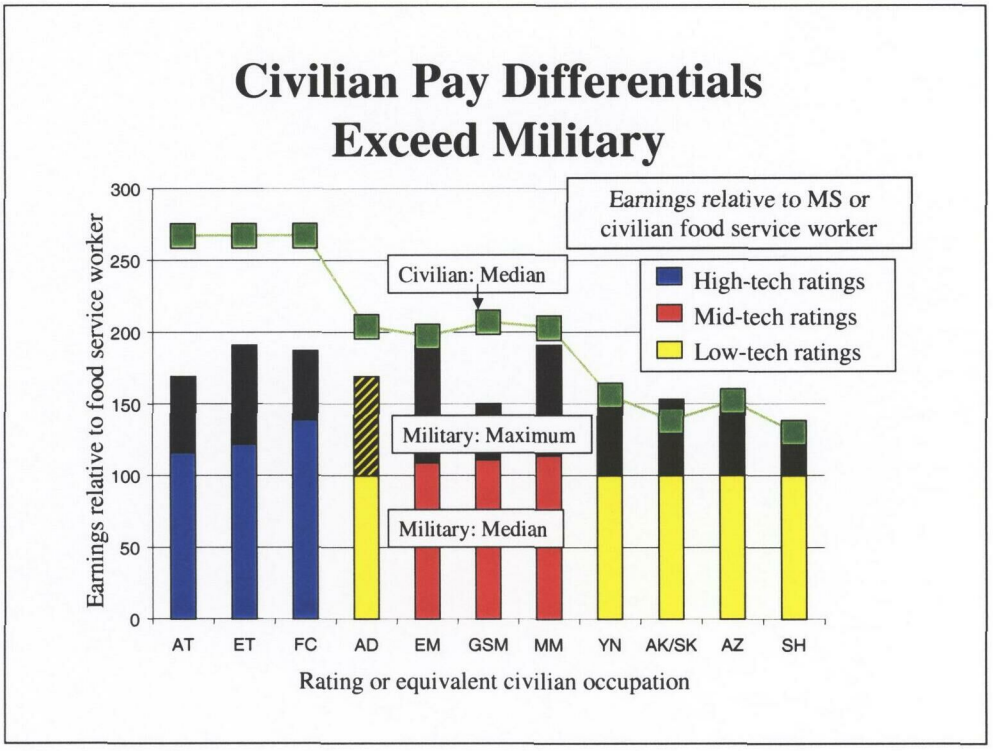
* Definitions of Navy ratings in equivalent civilian occcupations are listed in the appendix.



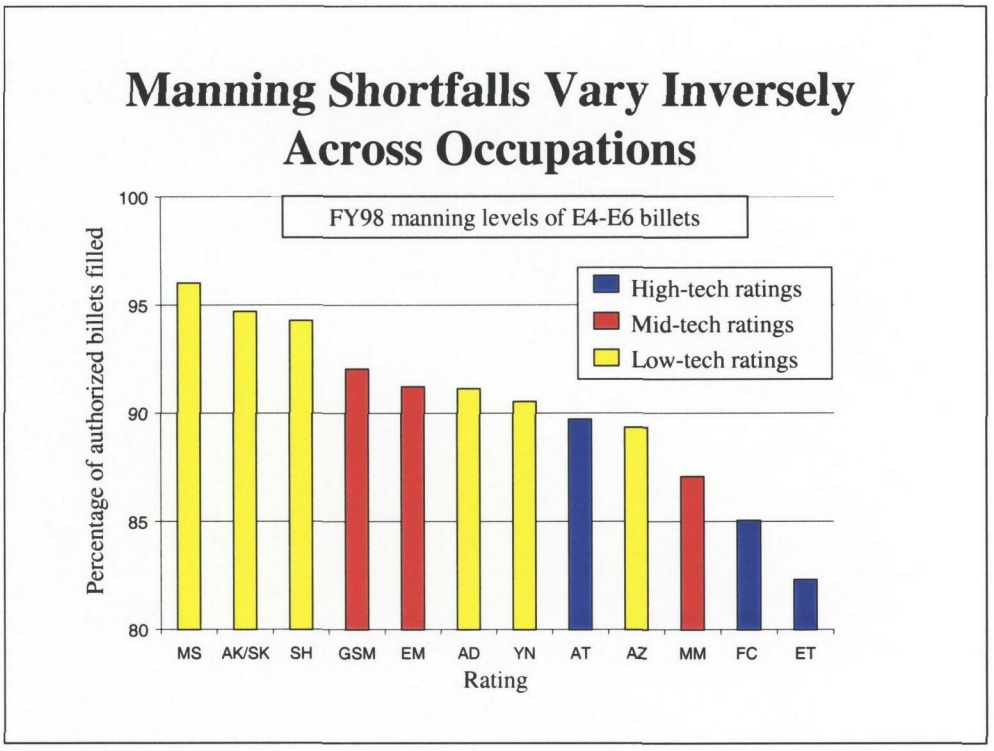

The previous slide showed that earnings vary widely across civilian occupations. This slide compares military and civilian occupational differentials. All differentials in this chart show pay relative to food service workers. The green boxes above the high-tech ratings show that civilian workers in similar occupations earn over 250 percent more than civilian food service workers. The civilian differentials are computed from the median civilian earnings in the previous slide, after restricting the sample to people with 45 months of employment.

For the military, we constructed both median and maximum earnings differentials relative to an MS. Differences in earnings across occupations come primarily from two sources: selective reenlistment bonuses (SRBs) and differences in advancement rates.

The solid portions of the bars compare military earnings at 45 months for the median individual in each rating to 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 because of differences in the median SRB from one rating to the next. Thus, we see that all the low-tech ratings had the same median SRB level (0) as MSs, whereas the median FCs got SRBs that made their earnings about 40 percent higher than those of MSs.

The striped portion of the bar measures the difference between median and maximum earnings in a rating. Maximum earnings differentials were computed by comparing the highest and lowest observed levels of compensation for an MS. At 45 months of service, then, the highest ranking ET who receives the highest SRB level earns about 90 percent more than an E3 with no SRB (the lowest paid MS).

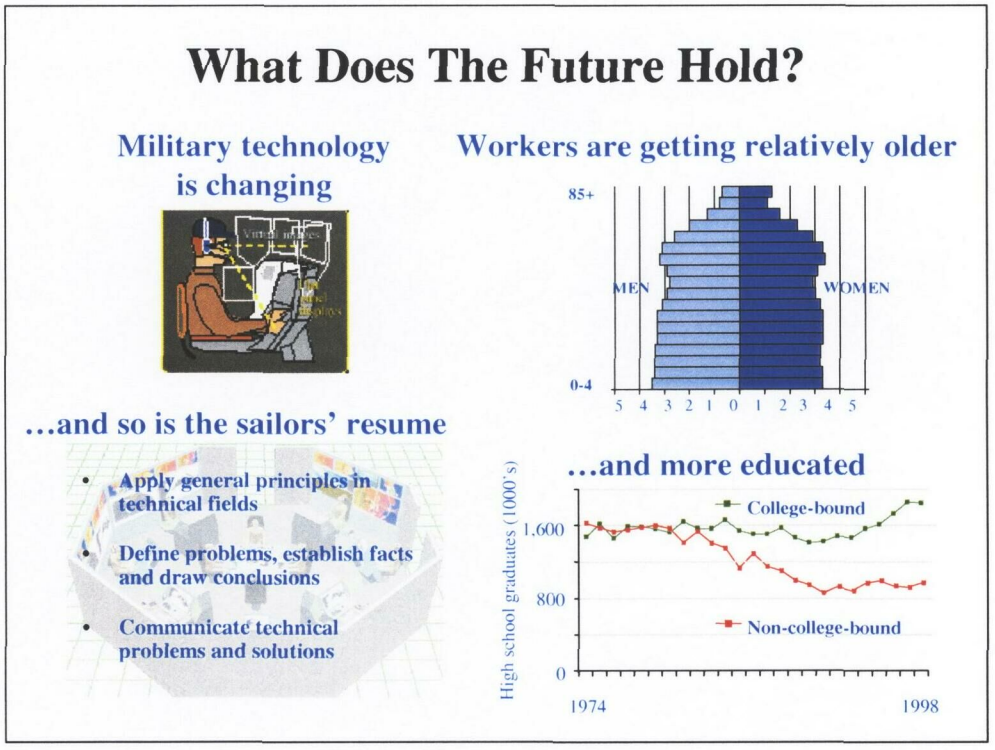
The good news on this chart is that the ratings with the highest civilian earnings potential also have the highest levels of military compensation. On the other hand, median military differentials are always lower than median civilian; even the maximum possible military differential can match civilian differentials only in the lower tech ratings. (The EM and MM maximum differentials are high because they include nukes.)




The previous slide showed that the military is not able to match differentials paid in the civilian sector for high-tech occupations. In the Navy, the average high-tech Sailor earns only 20 to 40 percent more than the less skilled and can earn at most about 90 percent more. This doesn't come close to the civilian earnings potential in high-tech occupations of over 250 percent more than less skilled occupations.

What is the result of the Navy's compressed pay structure? This slide shows the ratio of endstrength to authorized, active-duty billets, as a rating-by-rating measure of undermanning. While we realize that billets authorized (BA) isn't the ideal measure of required manning, we assume that BA and true requirements are correlated so that rankings of manning problems by rating would be similar whether one uses the ratio of manning to BA or to true requirements.

Since compensation is only one of many factors influencing manning shortfalls, we wouldn't expect a perfect correlation between undermanned ratings and ratings with high civilian earnings potential. This slide, however, shows that the majority of the yellow, low-tech ratings, which have lower civilian earnings, have a higher percentage of billets filled. On the other hand, the blue, high-tech ratings, which have higher civilian earnings, are more likely to fall on the right side of the chart, with a lower percentage of billets filled.




We now turn to problems that might arise in the future. A previous CNA analysis [8] 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.

In the 21st century, two compelling sets of forces will be at work. In fact, we are already feeling the effects. 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.

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.

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 the bottom left portion of this slide.

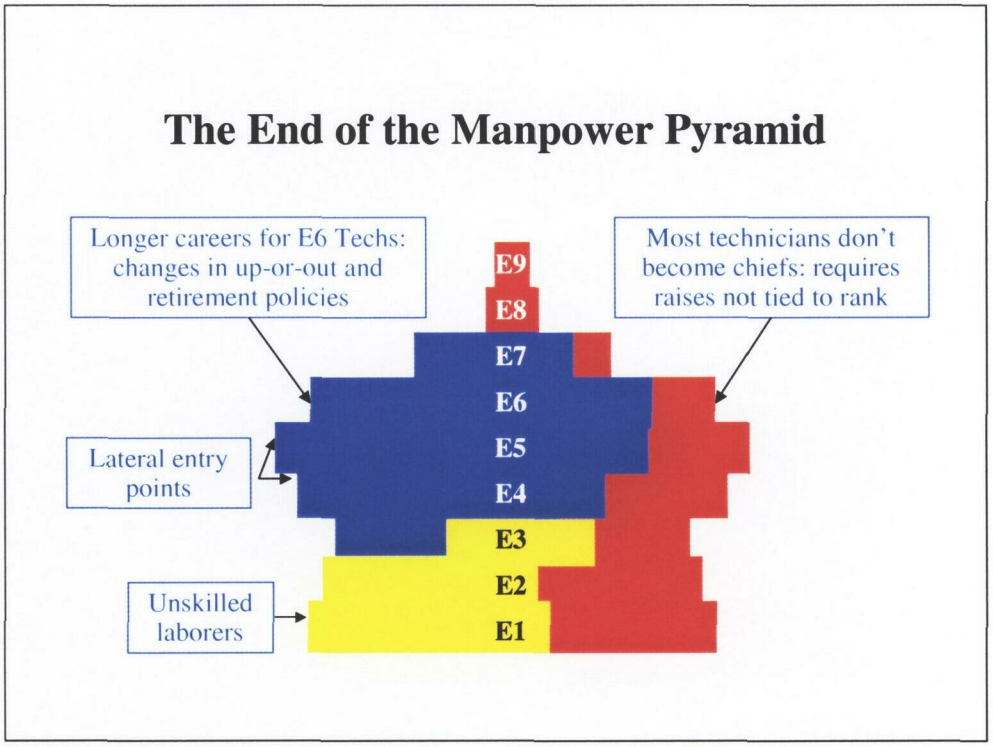
The future Sailor will need less knowledge about specific equipment and machinery but will have to master some technical field, such as acoustics, electrical engineering, or automated production processes. The Sailor will have to know the field well enough to apply his or her knowledge in new and unexpected 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.

The second set of changes will be in the civilian population and labor force. 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 gradual declines in population size as age increases. Now, however, increasing life expectancy and lower fertility rates are changing this pyramid to more of a pillar. Furthermore, 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.

Another important trend is the increase in the number of high school graduates who go on to college. Now, as many as two-thirds of high school graduates go on to enroll in postsecondary school. By relying only on high school graduates with no plans for postsecondary education, the Navy is targeting a shrinking proportion of the youth population.

Previous CNA research has already made a strong argument for making more use of civilian postsecondary education and training [9]. 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.

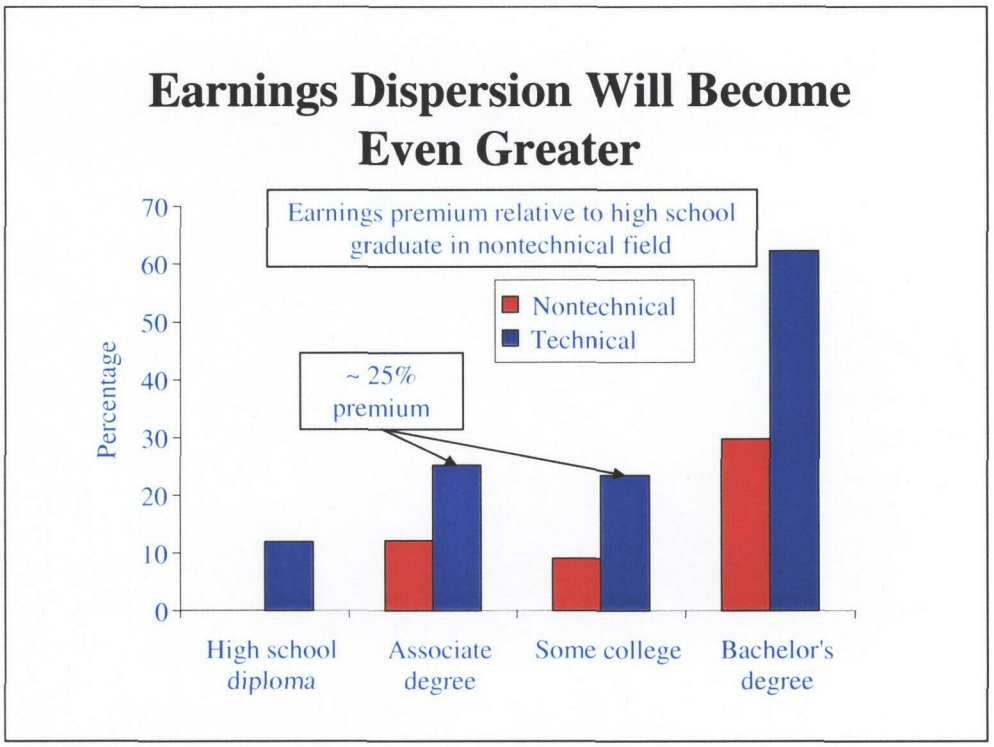



Changes in technology and required skills, along with simultaneous changes in civilian labor markets, imply that the Navy will have to make fundamental changes in the way it manages its workforce. Military services have traditionally used a promote-from-within labor force in which career paths and pay 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.

This slide 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 pay levels to provide them with compensation that meets their civilian alternatives.

This picture 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 rank. Higher rank has always meant more experience and more command authority, so the military is understandably reluctant to let people enter the service at high paygrades. 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.

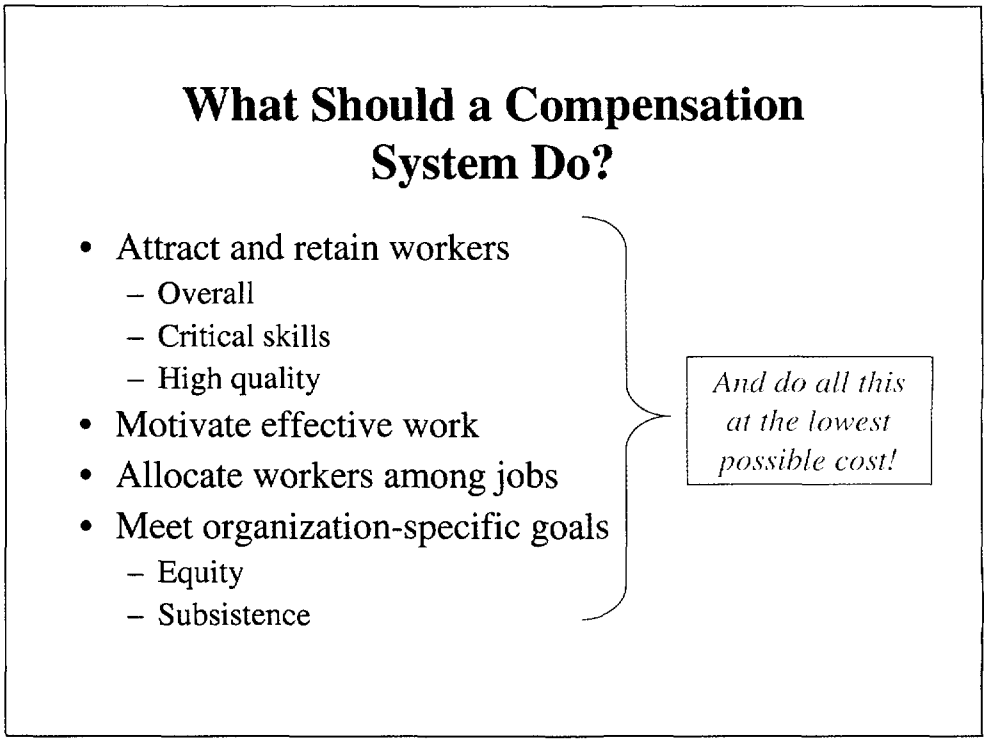



With the changes in the types of workers the Navy needs and in the educational levels attained by recruits, we believe that the occupational differentials needed to attract high-quality, high-tech workers will become even greater than they are today. We've already seen that the Navy can't currently match civilian occupational differentials. And we've seen the resulting manning problems in high-tech ratings. As the high-tech ratings increasingly need the types of educated, technical decision-makers in high demand in the civilian sector, the required pay differentials will increase.

This slide is based on data from the U.S. Department of Labor's Current Population Survey (CPS), in March 1995 and March 1997. We looked at annual earnings of full-time, nonagricultural workers between the ages of 21 and 40 with education up to a Bachelor's degree. We estimated differences in earnings by education and technical or nontechnical jobs, controlling for age, region, and whether the worker is employed by the government.

The premiums on the chart are all relative to high school graduates employed in nontechnical occupations. The average premium for technical workers with some college or Associate degrees is around 25 percent. If present technical occupations require a pay premium, then as military technology changes so that it requires the equivalent of some college or an Associate degree, the required premium may be expected to increase by another 12 to 25 percent.

Some people worry that there won't be enough people with the proper technological preparation available to meet future job demands. Our research indicates, however, that high school and postsecondary school graduates will be increasingly technologically literate. The strong competition for these workers, however, means that the Navy must be prepared to pay for what it needs.




We have identified some critical problems that the Navy faces because of shortcomings in its existing compensation system and have shown how these problems may intensify in the future. Now we turn to how the system could be improved. We start by considering what goals a compensation system should meet.

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 [10, 11] and from the human resource system literature [12, 13, 14]. This slide summarizes some of the most basic goals that the Navy might achieve using a strategically designed compensation system.

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 servicemembers 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.

## Which Goals Do Current Military Pays Meet?

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

This table 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.

Looking at this matrix, we can see that existing pays cover some goals fairly well, but not others. In particular, quite a few pays 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.

Recall that the first three rows of this table, along with other nondiscretionary pay elements, account for 93 percent of the Navy's compensation budget. 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. Given this, the critical skill, high quality, and allocation goals do not seem to be addressed well.

## How Does the Current System Measure Up?

- Less than 7% of pay is "discretionary" and amount of discretion is limited
- Pay elements heavily weighted toward overall manning, equity, and subsistence goals
- What goals aren't met well?
  - Allocation across jobs is imperfect
  - Attract and retain critical skills: private-sector occupational differentials can't be matched
  - Getting a high-quality workforce and motivating effective work limited to promotion tournaments

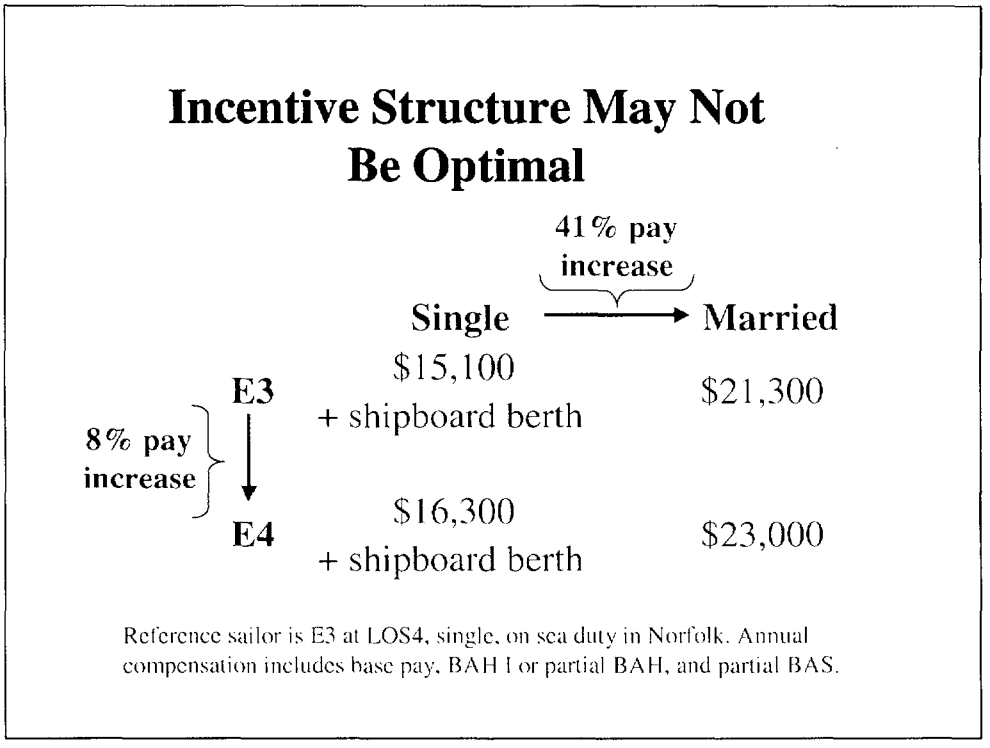
One of the most important facts about military compensation is that very little of the total compensation budget is in discretionary categories, and even in these categories the amount of discretion is limited. In the truest sense, a discretionary pay would be one that the appropriate level of command 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.

In FY 1999, less than 7 percent of the total Navy personnel budget was in categories called discretionary by DoD. In spite of many reform initiatives, the relative amount of discretionary pay has not grown much over time. For all services in 1968, special and incentive pays were only 6 percent of total compensation, and only 3 percent by 1978 [2].

The previous slide showed that three goals are best supported by the current system: 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. As an institution, the military assumes a greater obligation to take care of its members than an employer may to care for its employees.

The current system has fewer pay elements that enable the military to allocate people across jobs, provide sufficient occupational differentials, and promote effective work.

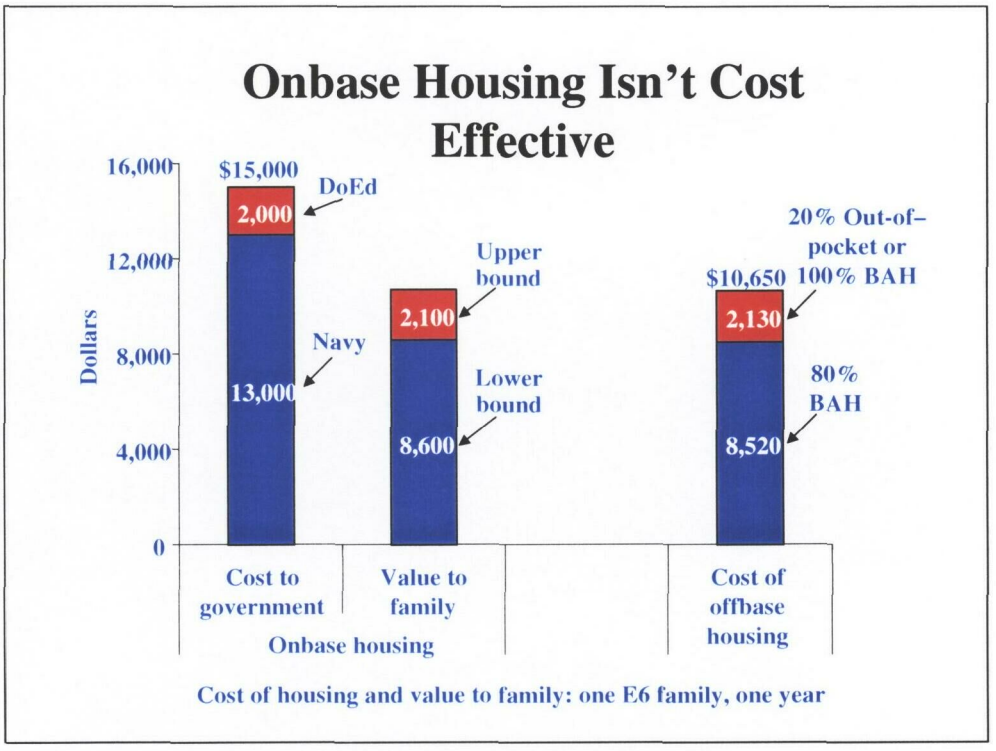



With its complex and inflexible array of pays, it should not be surprising that the military compensation system sometimes results in incentives that may have nothing to do with, or may even interfere with, strategic goals. This slide shows one example that arises from an allowance system that provides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

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-dependents 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 don't value shipboard berthing very highly.

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), increases in BAH due to marriage range from $2,000 to $2,500 per year—roughly equivalent to the additional compensation for advancing in rank.




Although not always considered as such, onbase housing is part of the compensation package. Thus, it should be examined to see whether it's consistent with a compensation strategy. Unfortunately, it seems not to be a very effective form of compensation.

A previous CNA study [15] found:

- It costs the military far more to house families on base than in the private sector. This slide shows, using 1997 prices, that the cost of housing one family on base for one year is $15,000—of which $13,000 is from the Navy budget and $2,000 is school impact aid from the Department of Education. On the other hand, an $8,520 allowance would pay 80 percent of private-sector housing costs for a typical E6 family. Even if allowances are increased so that the member pays no out-of-pocket costs, the Navy would pay only $10,650.
- Servicemembers value base housing far short of its cost. In 1997, the cost of housing a family on base for a year was $15,000, but the family would only derive value equal to offbase housing that cost $8,600 to 10,700.* Allowances equal to the value of onbase housing might be somewhat greater than 80 percent BAH rates, but they are within 100 percent BAH and well below the $15,000 cost.

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* Reference [15] estimates the implicit value of base housing using data on similar families' choices of on- or offbase housing and prices paid for offbase housing.

- The need for additional base housing is overstated because only the larger subsidies cause longer waiting lists. If servicemembers had to pay the full cost of onbase housing, there would be empty houses rather than waiting lists. Increasing BAH from 80 to 100 percent of housing costs should eliminate most waiting lists.

Another problem with base housing is that it favors large families. We've already looked at the "marriage incentive" implicit in BAH. Onbase housing provides another skewed benefit because larger families are given larger housing units. Since BAH depends only on whether you have dependents, and the value of onbase housing increases with the number of dependents, large families are more likely to benefit from base housing.

## Retired Pay Needs Reform

- Military retirement unique: generous, late vesting, defined benefit
- Rescinding Redux was counterrevolutionary
- Earlier, gradual vesting improves recruiting and early retention
- Competition and innovation in private-sector favors defined contribution
- One reform proposal: separate old-age annuity from force management tool

The military retirement benefit differs from most private or government pensions. Typical retirement plans have less generous benefits, earlier and more gradual vesting, and defined contribution rather than defined benefit pensions, and they don't pay any benefits until a fixed retirement age.

The Redux amendments in 1986 lowered retired benefits at 20 years of service (YOS), then gradually increased them from 20 to 30 years. The cumulative effect was to cut the value of retirement pay at YOS 20 by nearly 25 percent but by only 5 percent at YOS 30. This decrease in the cost and improvement in the incentives of retired pay could have been used to fund and leverage other compensation reforms. In 1999, however, in a counterrevolutionary fix, Redux was rescinded. Even worse, the cost of this counterrevolution may offset savings from truly revolutionary changes in other areas of the personnel system.

A similar issue involves vesting. By law, private-sector corporations can't delay vesting beyond 10 years of service and in practice many begin vesting earlier. Earlier, more gradual vesting increases the appeal of retired pay to recruits and improves early retention incentives.

According to the Hay Group Compensation study, in 1983 nearly all large companies had defined benefit pension plans, and about 2/3 had a combination of defined benefit and defined contribution. By 1997, a defined-benefit-only system had become quite rare—only about 1 percent of the companies. During that period, the percentage of large companies offering a defined contribution plan only grew from about 7 percent to about 36 percent.

Reference [6] argues that a one-size-fits-all retirement system exacerbates the difficulty of tailoring compensation to suit different occupations. The authors propose replacing immediate annuities at YOS 20 with an old-age annuity comparable to private-sector pension plans and cash separation payments that can vary by occupation as a flexible force management tool.

## Move Toward Two Market-Based Pay Elements

- Retain pay tables for equity goal
- Smooth transition by moving pay increases into market-based pays
- Collapse special pays into two flexible, market-based pays
  - Distribution incentive
  - Occupational differential
- Reform housing allowances and retired pay

In addition to housing allowance and retired pay reforms, we argue for retaining many of the features of the current military compensation system while gradually directing more pay 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.

The basic pay tables could be maintained to continue to meet the pay equity goal. But over time, as we see proof of the success of new pay elements, relatively less of new pay increases would be devoted to basic pay 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.

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, the market signals would be difficulties in filling specific types of billets, because of undesirable living or working conditions. For occupation pay, the market signals would be occupation-specific recruiting and retention problems.

## What Do We Mean By Market-Based Pay?

- Adjusted based on market signals
  - Difficulty filling certain types of billets
  - Occupation-specific recruiting and retention problems
- Authority to adjust pays quickly
  - Authority rests at "proper" level
  - See and respond to changing market conditions
- Allowing supply response is also essential
  - Voluntary assignments
  - Recruit to occupation

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.

Compensation may require adjustment with every change in mission, technology, the civilian economy, or demographic, educational, and social forces. As part of a dynamic economy, the military needs the ability to respond quickly to changing labor market 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 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.

## Expected Benefits

- Econ 101
  - Inflexible prices cause problems
  - Deregulation makes things better
- Advantages
  - Markets clear
  - Prices give correct resource allocation signals
- AVF means must pay for voluntary decisions to enter and stay
  - Either "pay me now or pay me later"
  - Allowing Sailor to choose preferred location/job costs less in long run

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, production and consumption decisions made 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.

In [8], we give a number of examples of problems caused by fixed prices (rent control, minimum wages) and benefits arising from allowing prices to move (railroad and trucking deregulation, IRS distribution incentives). Here we will discuss one example that is a direct parallel to insufficient military occupational differentials: teacher salaries.

Under the single-salary schedule, workers are paid according to a common schedule with salary differences depending on observable attributes, such as seniority, but not on the type of job. 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, and education units (e.g., Master's degree), but not 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.

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 [16, 17]. If preferences are not taken into account, people who are not satisfied with the outcome have less incentive to perform well or to continue the relationship. In the Navy's case, assignments that don't fulfill Sailors' desires will likely lead to job dissatisfaction and, ultimately, readiness and retention problems.

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 serving in an undesirable billet, but it pays them indirectly, normally at the reenlistment point. This indirect cost may be largely hidden from the resource sponsors who buy billets. 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.

Another 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. Flexible pays without good criteria for setting or changing them wouldn't help, but being able to show that they are based on clear market signals would help.

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 because it would take advantage of taste differences by allowing Sailors more choice. 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.

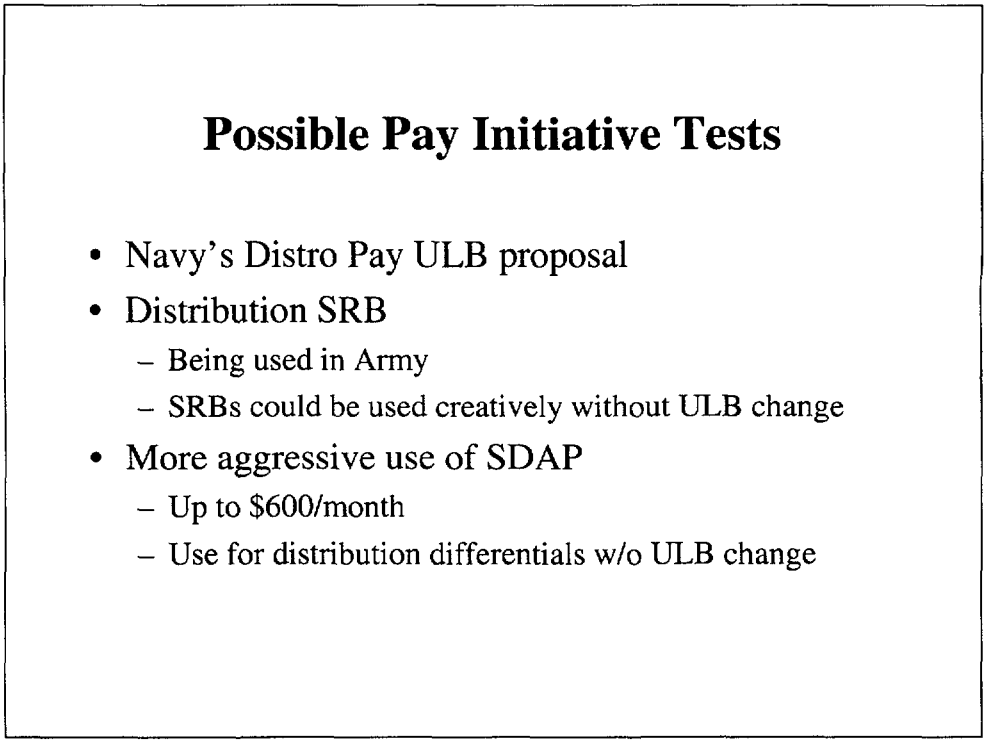
Some look at this involuntary system as a necessary evil; they believe that a voluntary system is either unachievable or too expensive. In reality, the Navy must pay Sailors one way or another—and, if it doesn't compensate them adequately for their duty, it must pay a potentially greater price in recruiting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

## We Should Be Experimenting and Evaluating

- Never had voluntary distribution so little data on response to pay
- Design a distribution pay experiment
- Collect data and estimate supply responses
- Pilot would provide
  - Basis for setting initial pay levels
  - Opportunity to test different mechanisms
  - Time to build infrastructure and gradual acceptance

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. Therefore, we don't know what the magnitude of voluntary responses to distribution incentive pay will be. We need one or more test projects to allow us to evaluate how well different market mechanisms work and to estimate pay elasticities or responsiveness within the distribution system.

Pilot programs, or test cases, will also allow gradual acceptance of these new pays to develop, and for infrastructures to be built and management problems resolved.




The Navy's Distribution Incentive Pay ULB proposal would be the best vehicle for testing market-based pay. It provides for up to $750 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 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).

Unfortunately, there's a chance that Distro Pay may be delayed or even scrapped because of the need to get all services' approval in the ULB process. If so, several existing pay elements could be used to design tests without the need for ULB approval. The Navy could experiment with a distribution SRB, as the Army is currently doing. Also, Special Duty Assignment Pay (SDAP) could be used more aggressively than it is at present.

## Conclusions

- Lack of market-based incentives reduces compensation system's effectiveness
  - Results in retention and manning problems
  - Nonmonetary incentives cause unintended side effects
  - Problems will intensify in future
- Need more flexible, responsive pay elements
  - Experience required to assess improvements in manning, retention, performance, etc.
  - Could lead to simplified compensation system

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 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 simplified and cost-effective assignment and compensation system based on a truly All-Volunteer Force.

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Note: This briefing is a condensation of work reported more fully in [8] and [18].

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# Backup Slides

# Compensation Strategy for the Future Force

## Enlisted Ratings and Comparable Civilian Occupations

Table 1. Definitions of enlisted ratings

| Rating | Definition | Description |
|---|---|---|
| AD | Aviation Machinist's Mate | ADs are assigned to billets concerned with maintaining turbo-jet aircraft engines and associated equipment or to other aircraft maintenance activities. ADs maintain, service, adjust and replace aircraft engines and accessories, and perform the duties of flight engineers. |
| AK/SK | Aviation Storekeeper/ Storekeeper | AKs and SKs are the Navy's supply clerks. AKs ensure that materials and equipment needed by naval aviation activities are available and in good order. They take inventories, estimate future needs and make purchases. AKs store and issue flight clothing; aeronautical materials and spare parts; ordnance; electronic; and structural and engineering equipment. SKs see that needed supplies are available including everything from clothing and machine parts to forms and food. SKs have duties as civilian warehousemen, purchasing agents, stock clerks and supervisors, retail sales clerks, store managers, inventory clerks, buyers, parts clerks, bookkeepers and even fork lift operators. |
| AT | Aviation Electronics Technician | Modern aircraft depend on radio, radar and other electronic devices for rapid communications, effective navigation, controlled landing approaches and neutralizing enemy equipment and tactics. ATs are responsible for the test, maintenance and repair of this equipment. |
| AZ | Aviation Maintenance Administrationman | The many clerical, administrative and managerial duties necessary to keep aircraft maintenance activities running smoothly are handled by the AZs. They plan, schedule and coordinate the maintenance workload, including inspections and modifications to aircraft and equipment. |
| EM | Electrician's Mate | The operation and repair of a ship's or station's electrical power plant and electrical equipment is the responsibility of EMs. They also maintain and repair power and lighting circuits, distribution switchboards, generators, motors and other electrical equipment. |
| ET | Electronics Technician | ETs are responsible for electronic equipment used to send and receive messages, detect enemy planes and ships, and determine target distances. They must maintain, repair, calibrate, tune and adjust all electronic equipment used for communications, detection and tracking, recognition and identification, navigation and electronic countermeasures. |
| FC | Fire Controlman | FCs maintain the control mechanism used in weapons systems on combat ships. Complex electronic, electrical and hydraulic equipment is required to ensure the accuracy of Navy guided missile and surface gunfire-control systems. FCs are responsible for the operation, routine care and repair of this equipment. |

| | | |
|---|---|---|
| GSM | Gas Turbine System Technician-Mechanical | GSMs operate, repair and maintain gas turbine engines; main propulsion machinery, and assigned auxiliary equipment propulsion control systems. They also perform administrative tasks related to gas turbine propulsion system operation and maintenance. |
| MM | Machinist's Mate | Continuous operation of the many engines, compressors and gears, refrigeration, air-conditioning, gas-operated equipment and other types of machinery afloat and ashore is the MM's job. They are also responsible for the ship's steam propulsion and auxiliary equipment and the outside (deck) machinery. |
| MS | Mess Management Specialist | MSs operate and manage Navy dining facilities and bachelor enlisted quarters. They cook, bake, order, inspect and stow food in Navy dining facilities ashore and afloat. They maintain food service; prepare spaces and equipment; and keep records of transactions and budgets for food service in living quarters ashore. |
| SH | Ship's Serviceman | Serving afloat, SHs manage barber shops, tailor shops, ships' uniform stores, laundries, and dry cleaning plants. |
| YN | Yeoman | YNs perform secretarial and clerical work. They deal with visitors, telephone calls and incoming mail. YNs organize files and operate copy machines and order and distribute supplies. They write and type business and social letters, notices, directives, forms and reports. They maintain files and service records. |

The second table lists the matches of ratings and civilian occupations. Column 1 shows all ratings that mapped into the same civilian occupation. The second column presents the 3-digit classification used by the CPS, the 1990 Census of Population Occupation Classification. Finally, column 3 describes the civilian occupation used in the CPS.

Table 2. Enlisted ratings and comparable civilian occupations

| Rating | CPS codes | Description |
|---|---|---|
| AD | 508 | Aircraft engine mechanics |
| AK, SK | 359-374 | Material recording, scheduling, and distributing clerks |
| AT, ET, FC[a] | 55 | Electrical and electronic engineers |
| AZ | 325-336 | Records processing occupations, except financial |
| EM | 523-533 | Electrical and electronic equipment repairers |
| GSM | 518-519, 694-699 | Industrial machinery repairers, machinery maintenance occupations; plant and system operators |
| MM | 518-519 | Industrial machinery repairers, machinery maintenance occupations |
| MS | 434-444 | Food preparation and service occupations |
| SH | 263-278 | Sales workers, retain and personal services |
| YN | 313-315 | Secretaries, stenographers, and typists |

a. Only higher-tech NECs were used for AT, ET, and FC. See [7] for more detail.

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# References


[1] Richard V. Cooper. *Military Manpower and the All-Volunteer Force*, Sep 1977 (RAND R-1450-ARPA)

[2] Martin Binkin and Irene Kyriakopoulos. *Paying the Modern Military.* Washington, DC: The Brookings Institute, 1981

[3] John T. Warner. *Issues in Navy Manpower Research and Policy: An Economist's Perspective*, Dec 1981 (CNA Professional Paper 322)

[4] David K. Horne and Curtis L. Gilroy. "Introduction." In Curtis L. Gilroy, David K. Horne, and D. Alton Smith (eds.), *Military Compensation and Personnel Retention: Models and Evidence.* Alexandria, VA: U.S. Army Research Institute, Feb 1991

[5] Beth J. Asch and John T. Warner. *A Theory of Military Compensation and Personnel Policy*, 1994 (RAND Corporation Report, MR-439-OSD)

[6] Beth J. Asch and John T. Warner. *A Policy Analysis of Alternative Military Retirement Systems*, 1994 (RAND Corporation Report, MR-465-OSD)

[7] Michael L. Hansen. *Compensation and Enlisted Manning Shortfalls*, Sep 2000 (CNA Research Memorandum D0001998.A2)

[8] Martha E. Koopman and Heidi L. W. Golding. *Optimal Manning and Technological Change*, Jul 1999 (CNA Research Memorandum 99-59)

[9] Peggy A. Golfin, John D. White, and Lisa A. Curtin, CDR, USN. *A Role for Community Colleges in Navy Training*, Mar 1998 (CNA Research Memorandum 97-97)

[10] Beth J. Asch. *Designing Military Pay: Contributions and Implications of the Economics Literature*, 1993 (RAND Corporation Report, MR-616-FMP)

[11] Paul F. Hogan et al. *Conceptual Framework for Analyzing and Developing a Compensation System*, Feb 1995 (Report prepared for the 8th QRMC by Lewin-VHI, Inc.)

[12] Edward E. Lawler. *Strategic Pay: Aligning Organizational Strategies and Pay Systems.* San Francisco: Jossey-Bass Publishers, 1990

[13] Department of Defense, *Seventh Quadrennial Review of Military Compensation*, Aug 1992

[14] Department of Defense, *Rewarding, Organizing and Managing People for the 21st Century: Time for a Strategic Approach—The Executive Report, 8th QRMC*, Jun 1997

[15] Glenn H. Ackerman and Alan J. Marcus. *Housing Benefits Baseline Analysis*, Apr 1997 (CNA Research Memorandum 97-26)

[16] Sherwin Rosen. "The Theory of Equalizing Differences," in *Handbook of Labor Economics, Volume 1*. New York: Elsevier Science, 1986, 641-692

[17] Alvin E. Roth. "A Natural Experiment in the Organization of Entry-Level Labor Markets: Regional Markets for New Physicians and Surgeons in the U.K." *American Economic Review*, 81(3), Jun 1991, 415-440

[18] Martha E. Koopman et al. *Compensation Strategy for the Future Force*, Sep 2000 (CNA Research Memorandum D0002082.A2)

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