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The Fourth Annual Navy Workforce Research and Analysis Conference: Laying the Foundation for the Navy's Human Resource Strategy

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Introduction

> And the year five project is, ladies and gentlemen, about the human resource strategy.
>
> —*ADM Vern Clark, Chief of Naval Operations* [1]

As the Chief of Naval Operations (CNO) announced in his keynote address to the researchers, Servicemembers, policy-makers, and members of the press assembled for the *Fourth Annual Navy Workforce Research and Analysis Conference*, he hopes to make development of a new Navy human resource strategy the CNO project for the coming year.[1]

Developing a human resource strategy—a coherent set of management tactics, policies, and practices—is a challenge facing many organizations in today's competitive environment. Even President Bush previously has identified human capital management as an area in need of extensive, government-wide reform [2].

But developing such a strategy requires a clear and comprehensive understanding of the key factors that will serve as its foundation. A recent book, *Play to Your Strengths*, describes the six factors on which a human resource strategy must be built [3]:

1. People
2. Work Processes
3. Managerial Structure
4. Information and Knowledge

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1. The conference was sponsored by VADM Gerald L. Hoewing (N1/CNP), with participation from the Office of Naval Research (ONR), the Navy Personnel Research, Studies, and Technology (NPRST) department, the Naval Postgraduate School (NPS), and the Center for Naval Analyses (CNA).

5. Decision-Making
6. Rewards.

These factors encompass most of the work that the manpower research community performs today.

This year's conference, held March 29 and 30, 2004, brought together Navy leadership and the research community to discuss how today's research and development efforts can support leadership's evolving manpower, personnel, and training vision—which includes the development of a new human resource strategy. As the CNO noted, the conference's purpose is "to be the kind of event where the brutal facts bubble to the surface, and we have a very stimulating discussion that will lead us to future solutions" [1].

In this document, we relate the manpower, personnel, and training research that members of the research community presented at the conference to the framework for building a human resource strategy outlined in *Play to Your Strengths* [3].[2] Each major section that follows focuses on one of the six key factors that underpin development of a human resource strategy. As the Navy begins to develop its new human resource strategy, we believe that this body of work will provide the solid foundation and the "brutal facts" needed to inform and shape efforts.

2. The author gratefully acknowledges the assistance of John Fraser, Naval Academy intern, and the conference presenters and chairs in the preparation of this report.

People

> I think at the heart of a human resource strategy [is] a definition of what you believe about people.
>
> —*ADM Vern Clark, Chief of Naval Operations* [1]

As the CNO and the CNP have stressed repeatedly, getting the right people, in the right place, in the right numbers is a vital part of the Navy's manpower vision.

Right person

Selecting the right person is central to a human resource strategy. But doing so requires tools that can identify just who the "right" person is. Several conference briefings described such tools.

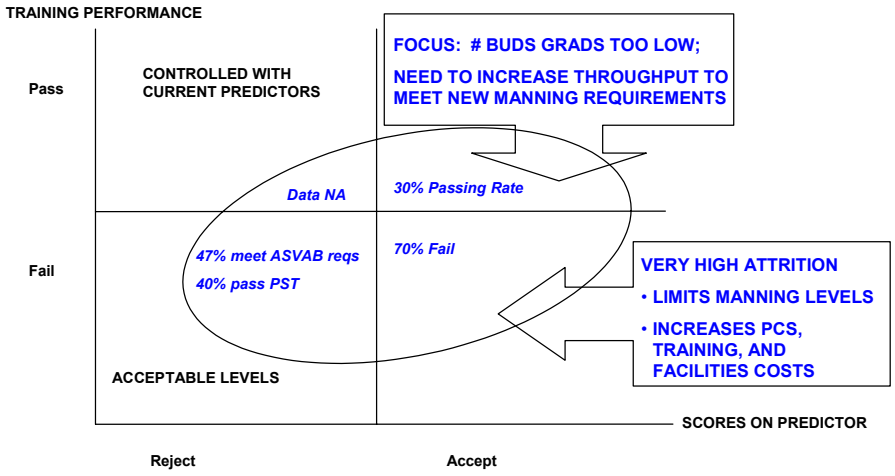
For example, the Global War on Terrorism has generated increased manning requirements for Navy Special Forces, including Navy SEALs. One challenge in meeting these new requirements is the historically high attrition rate (over 70 percent) in Basic Underwater Demolition (BUDS)/SEAL training. Dr. Lisa J. Mills (Navy Selection and Classification Office, N132F) described her analysis of the SEAL selection process and recommended strategies for improvement [4].

To be selected for SEAL training, candidates must meet minimum qualifying scores on the Armed Services Vocational Aptitude Battery (ASVAB) and minimum performance standards on the SEAL Physical Screening Test. But given high SEAL training attrition rates, these measures do not seem sufficient indicators of success (see figure 1).

Dr. Mills's near-term efforts have focused on maximizing the validity of the current predictors and bringing better candidates to SEAL training. She recommended several strategies for reducing attrition, including optimizing the SEAL Physical Screening Test, re-validating

the ASVAB composite used for SEAL program entry, and studying the qualities that characterize good SEAL candidates.

Figure 1. Diagnosis of current SEAL selection system[a]



a. Source: Dr. Lisa J. Mills, "Optimizing Seal Selection," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [4].

Dr. Mills explained that the selection ratio is another critical factor influencing a selection system's effectiveness. This ratio is the number of candidates selected out of the total number screened. The more candidates needed and the more selective the program, the lower the selection ratio should be to capitalize on the predictors' validity. Using new vocational interest technology, JOIN, to achieve the appropriate selection ratio may expand SEAL applicant pools.

She suggested that a longer term effort will focus on augmenting existing predictors with psychological tests of personality/temperament/stress resilience—ultimately creating a comprehensive battery of SEAL training predictors.

Good marksmanship is important to all of the Services. But, as Dr. William Bewley (UCLA/CRESST) noted, little attention has been focused on the cognitive components of marksmanship [5].

In a study for the Marine Corps, Dr. Bewley measured knowledge of marksmanship fundamentals for over 200 Marines at two locations using a battery of assessments, including knowledge maps, identification of shooting position errors, interpretation of shot patterns, and prior shooting experience. He also created a database linking and describing marksmanship concepts and tied assessment results to remedial instruction. His goal was to identify potentially unqualified Marines before they reached the firing line—improving performance, reducing time, and lowering costs.

Across samples of Marines differing in prior experience, the cognitive measures predicted qualification scores ranging from .52 to .80. Dr. Bewley found that cognitive and prior experience variables were important predictors for less experienced shooters, but prior experience was more important than cognitive variables for more experienced shooters.

In the future, Dr. Bewley plans to field the cognitive tools for use in the Coaches Course and the USMC Weapons Training Battalion. He also will be involved with ONR work on the cognitive determinants of psychomotor skills and the use of assessments for diagnosis/prescription.

Dr. William Farmer (NPRST) described another tool, ENCAPS, that will allow the Navy to better select and classify applicants [6]. Using innovative psychological assessment techniques, ENCAPS allows Navy classifiers to create personality profiles to facilitate selection into the Navy and classification for optimal person-job fit.

Dr. Farmer noted that the current classification process is inefficient—it assigns 45,000 recruits to more than 100 jobs based solely on ASVAB scores, manpower needs, and a short interview. The goal of ENCAPS is to obtain more information on applicants through AFQT scores, medical fitness scores, background checks, and whole person assessments. Figure 2 shows the personality constructs that ENCAPS tests.

Dr. Farmer believes that this information will improve the quality of classification decisions—reducing unwanted attrition, improving retention, and increasing job satisfaction. In fact, preliminary analysis indicates that the ability to predict performance over and above what currently can be done with ASVAB alone may be increased by as much as 40 percent in some Navy jobs.

Figure 2. Major personality constructs identified for ENCAPS testing[a]

- **Achievement motivation**
- **Stress tolerance**
- **Social orientation**
- **Adaptation/flexibility**
- **Attention to detail**
- **Self-reliance**
- **Vigilance**
- **Dependability**
- **Dutifulness/integrity**
- **Willingness to learn**

a. Source: Dr. William Farmer, "ENCAPS—Using Non-Cognitive Measures for Selection & Classification," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 29, 2004 [6].

ENCAPS is being developed through a series of pilot tests. The first, which was conducted with NROTC students in two locations between September and October 2003, was used to determine the set of non-cognitive abilities. Another pilot test will be conducted with RTC recruits in June 2004.

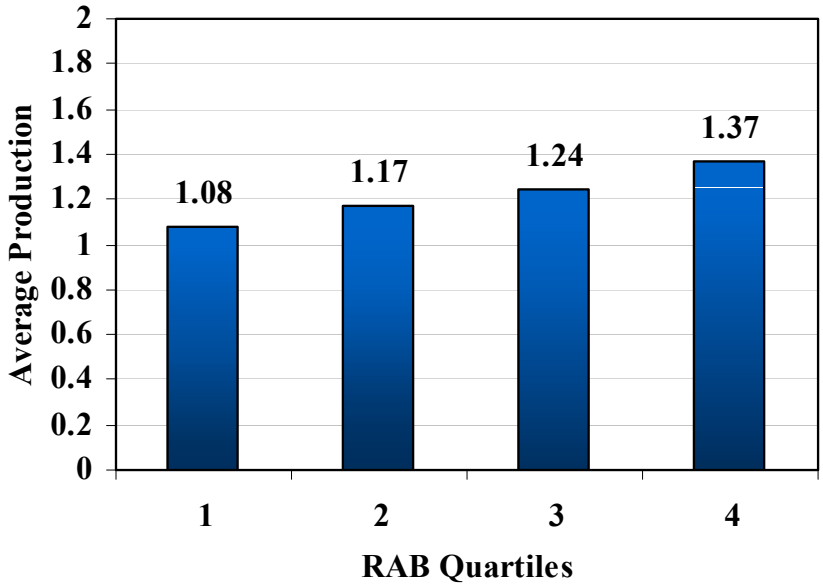
Selection tools are not only for selecting the right recruit; they also can be used to identify the right Servicemember for the job. Mr. Ronald Bearden (NPRST) described the development of a new screening tool, the Recruiter Assessment Battery (RAB), for identifying Sailors with high potential for success in recruiting duty [7].

The RAB includes assessments of personality, emotional intelligence, and interests. During the first phase of his research, Mr. Bearden conducted a predictive validation of the RAB using approximately 600 students at the Navy Recruiting Orientation Unit in Pensacola, FL. Students took a prototype battery on their first day at the school, and supervisory performance ratings and production data were collected nine months later (to allow recruiters to acquire at least six months of experience).

Mr. Bearden found that validities of the personality predictors were especially promising for two of the scales in the test battery, with correlations ranging from .13 to .27 against rating scales and production criteria. In the second phase, the prototype battery was revised (some components were dropped or reworked) based on the results of the

predictive study. The revised battery was validated in a concurrent validity design against performance ratings and production of experienced field recruiters. Validities were comparable to those found in the predictive study, with a composite key of .27 (see figure 3).

Figure 3. Utility of the Recruiter Assessment Battery (RAB)[a]



a. Source: Mr. Ronald Bearden, "Recruiter Selection Research in the U.S. Navy," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [7].

Mr. Bearden also helped to develop recruiter performance criteria, which included a standardized production per recruiter measure and a supervisory rating scale designed to measure performance across all behavioral job requirements.

In the future, he plans to improve the efficiency of data collection by transitioning from the paper-based RAB to a web-based format. This will allow for immediate RAB scoring and real-time reporting of the results. He also will administer the RAB at other sites.

Dr. Lisa J. Mills and Mr. Dustin Scott (Navy Selection and Classification Office, N132F) described how another battery is being used to

transition Sailors into the "right" rating [8]. The Navy has traditionally used the ASVAB as a selection and classification tool for recruit accessions; however, Sailors in the Fleet also are eligible to take an in-service version of the test, the Armed Forces Classification Test (AFCT), to raise their scores. Better scores allow Sailors to "strike" or convert to a larger selection of ratings. By expanding Sailors' qualifications and rating opportunities, the AFCT helps support such force-shaping initiatives as Perform to Serve (PTS) by making personnel inventory more distributable.

Data gathered since the advent of PTS allowed the researchers to study whether Sailors' scores (as measured by the AFCT) increased over time. The researchers' test score analyses show statistically significant increases on all subtests of the AFCT between Sailors' accession scores and re-tests. Their classification simulations with the sample demonstrate the substantial impact these increases have on qualification rates (see figure 4).

Figure 4. Classification impact of fleet re-tests[a,b]

	ASVAB		AFCT	
Sailor	**Jobs**	**CREO 1 Jobs**	**Jobs**	**CREO 1 Jobs**
1	**44**	**8**	**79**	**12**
2	**7**	**1**	**150**	**31**
3	**52**	**5**	**142**	**18**
4	**17**	**1**	**77**	**9**
5	**31**	**5**	**59**	**8**

•Sailor 1: Average Sailor in sample

•Sailors 2 and 3: Dramatic increases

•Sailors 4 and 5: Functional skills courses

*Figures represent number of *Accession* Jobs qualified

a. Source: Dr. Lisa J. Mills and Mr. Dustin Scott, "Force Shaping and the AFCT," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 29, 2004 [8].

b. CREO (Career Reenlistment Objectives) jobs are those that are undermanned.

Their analysis suggests some possible explanations for score increases, including increased language proficiency for those speaking English as a second language and improved scores on technical subtests for those in technical ratings. They also tested the ability of functional skill courses, such as those taught through PLATO, to improve scores—finding significant score improvements for those completing the courses.

Perform to Serve (PTS) is designed to support efforts to balance the force skill mix. As Dr. Stephen E. Watson (Navy Selection and Classification Office) noted, this and other conversion processes also allow the Navy to reassess the Sailor-to-Rating fit, which may have changed since accession if Sailor's interests, testable abilities, and other qualifications have changed [9]. Doing so allows the Navy to optimize a Sailor's future performance and career progression.

Dr. Watson described the Rating Identification Engine (RIDE) technology, which has been validated in accession contexts to optimally match Sailor aptitudes and qualifications with rating requirements, and demonstrated the RIDE tool. In accession contexts, RIDE use lowered DEP attrition and raised training pass rates. Fleet RIDE adapted this technology for vocational guidance in the Fleet, and specifically for use with PTS.

Dr. Watson discussed conversion success rates from pilot platforms USS *Belleau Wood* (LHA-3) and USS *Valley Forge* (CG0-50) and training cost reductions from reclassification efforts at Naval Submarine School, New London, CT. He found that RIDE use decreased the number of "unqualified" PTS packages and decreased transfer time (from six months to one month on average) to the Submarine School. He noted that both RIDE prototypes have demonstrated early returns on investment and enthusiastic user acceptance. In fact, he has made several enhancements and functionality changes to the Fleet RIDE interface based on feedback from these test sites.

Dr. Stephen Mehay (NPS) and Dr. William Bowman (USNA) described their statistical analysis of commissioning programs' effect on the performance of U.S. Marine Corps officers [10]. The study examined whether commissioning programs that provide longer and more intensive pre-commissioning military acculturation result in

better job matches and stronger career performance in the Fleet. Figure 5 shows 2001 Marine Corps officer accessions by commissioning source.

Figure 5. Marine Corps officer accessions by commissioning source, 2001[a]

❖ *Program*	❖ *2001 Accession Pct.*
• Platoon Leaders Course (PLC)……	• 23.5%
• Officer Candidate's Course (OCC)……..	• 36.0%
• NROTC……..	• 13.7%
• USNA……	• 11.1%
• Enlisted programs (MECEP, ECP,MCP)…	• 15.3%

a. Source: Dr. Stephen Mehay and Dr. William Bowman, "Commissioning Source and USMC Officer Performance," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [10].

Dr. Mehay and Dr. Bowman constructed a personnel database of more than 28,000 Marines commissioned between 1980 and 2000 and tracked officers until separation or the year 2000. They specified and estimated models for several performance indicators related to fitness reports, performance at The Basic School (TBS), retention, and promotion.

They found that commissioning source was an important determinant of officer performance. Their results suggest that USNA graduates have better fitness reports at all grades between O-1 and O-4 and higher O-5 promotion rates (PLC and OCC-commissioned officers have higher O-4 promotion rates). Officers from the three enlisted commissioning programs, however, have significantly better TBS performance and 10-year retention rates.

The researchers concluded that the MECEP program is cost-effective, and recommended a modest expansion of that enlisted commissioning program. They also concluded that higher retention and strong within-grade performance for USNA graduates support increasing the flow of Marine officers from that source. They noted that this could be done by allowing a greater share of each graduating class to choose the Marine option.

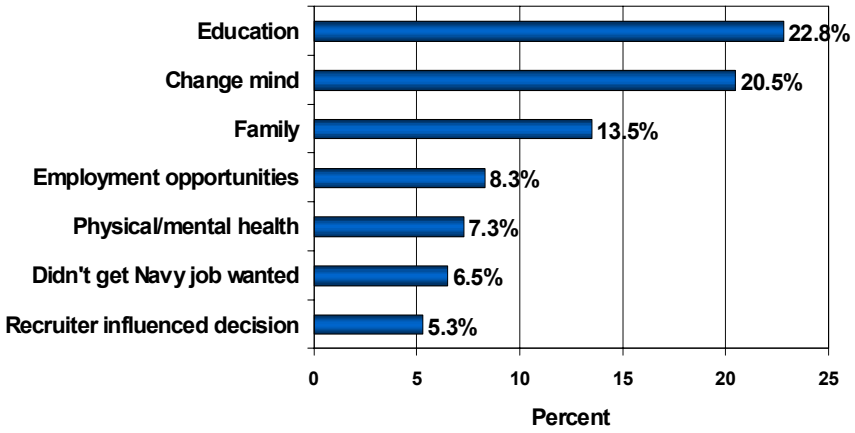
Once enlisted, a future Navy recruit may spend time in the Delayed Entry Program (DEP). While in the DEP, he or she becomes more familiar with the Navy and participates in physical fitness, educational, and team-building activities.

Given the time and effort invested in recruits, it is important to know why they attrite. Ms. Marian Lane (NPRST) examined trends in, and predictors of, DEP attrition [11]. She examined telephone interview data from 600 Navy enlistees who attrited from the DEP between January and August of 2003. These interviews examined enlistees' experiences before, during, and after DEP enrollment. She also examined interview data from 50 recruiters, who had contact with the enlistees participating in the telephone survey. These interviews examined recruiters' experiences with the DEP process and DEP attrition.

From the enlistees' interviews, she found that the largest share of those who attrited had joined for travel and new experiences (19 percent), followed by employment opportunities (17 percent) and education (14 percent). Enlistees found their recruiting experience to be mostly positive (55 percent said it was good or excellent) and the majority reported that the frequency and length of DEP meetings was "about right." Enlistees who attrited from the DEP most frequently did so to pursue education (see figure 6), and almost half said they had experienced at least some regret or doubt about leaving.

Recruiters' perceptions of the top reasons enlistees attrited from the DEP largely matched those reported by attrites. But, recruiters also cited being in DEP too long before shipping more often than attrites (32 percent vs. 2 percent). Recruiters largely agreed that lack of contact with enlistees and lack of attendance at DEP meetings were risk factors for dropping from the program. But 84 percent of recruiters interviewed believed there was nothing they could have done to affect the recruit's decision to leave.

Figure 6. Top reasons for attriting from the DEP[a]



a. Source: Ms. Marian Lane, "Delayed Entry Program (DEP) Attrition," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [11].

Ms. Lane also discussed possible interventions to lower unwanted DEP attrition (determining the optimal time between DEP enrollment and entrance into initial recruit training, taking immediate action when a recruit seems likely to attrite, and evaluating DEP meetings). In the future, she would like to evaluate the DEP program to determine whether individuals' needs are being met under current procedures and recommend DEP changes based on the evaluation's results.

Whether or not a recruit is a regular high school diploma graduate (HSDG) affects both DEP and fleet attrition. For example, Marine Corps first-term attrition rates in the last decade were 31 percent for HSDGs and 50 percent for general equivalency diploma (GED) holders. For this reason, OSD requires that 90 percent of military accessions be HSDGs, and several Services require higher percentages.

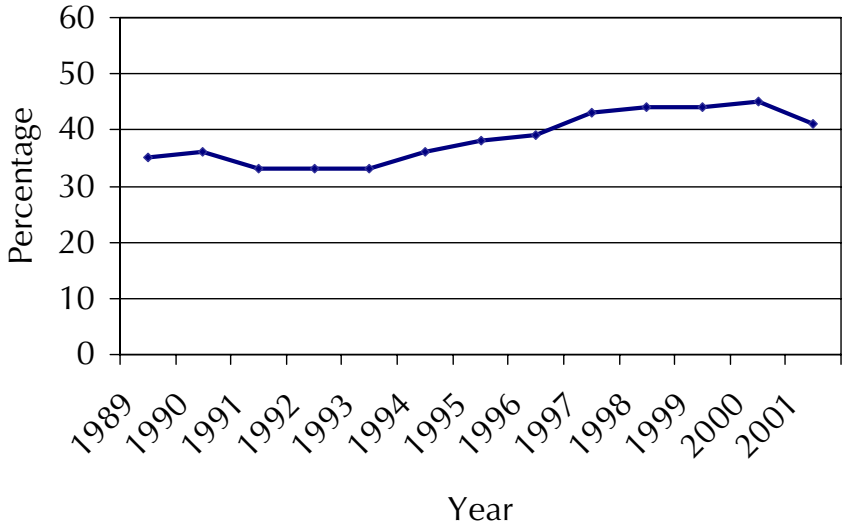
Until recently, the percentage of young people obtaining regular high school diplomas had been steadily increasing. The reversal of this trend is particularly troubling since much of the future growth in the youth population will be Hispanic, and Hispanics have lower high school completion rates than those of other demographic groups.

Dr. Aline Quester (CNA) and SgtMaj (Ret.) Lewis G. Lee (CNA) suggested that these trends indicate that the military needs to focus on the percentage of young people who obtain GEDs [12].

These researchers traced the history of the GED program, noting that OSD started it to provide returning veterans with educational credentials so that they could use the GI Bill. By the late 1940s, however, states began offering GED exams to any high school dropout. Currently, about 800,000 dropouts take the exam yearly, and about 500,000 earn GEDs.

Dr. Quester and SgtMaj Lee expressed concern that the GED might encourage youth to drop out of school. Although statistical issues complicate analysis, weak evidence shows that this might be the case. The federal minimum age to take the GED is only 16, although states can set higher minimums. But, as figure 7 shows, a growing share of GEDs are issued to those who are still of school age.

Figure 7. Share of GEDs issued to those age 19 or younger[a]



a. Source: Dr. Aline Quester and SgtMaj (Ret.) Lewis G. Lee, "High School Graduates: HSDGs, GEDs, and Other Demographic Issues," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [12].

They noted that the Army and the Ad Council have sponsored a stay-in-school campaign (titled "Operation Graduation") and suggested that OSD should consider a similar partnership with the Department of Education. They also recommended that the federal minimum age to take GED be raised from 16 to 20.

Choosing the right person is not just about finding the right military recruit for the right job. It also requires determining whether a particular job is best filled by a Servicemember, civilian, or contractor. Dr. Pat Mackin (SAG Corporation) described his efforts to help the Navy make this determination [13].

Dr. Mackin noted that when a Navy job is not military essential or inherently governmental, it should be filled in the most cost-effective manner possible. Unfortunately, the tools necessary to model changes in civilian manpower requirements and workforce flows or accurate manpower cost data are not always available.

Dr. Mackin said that, to determine civilian requirements, one must move from workload to requirements—measuring total taxpayer cost and comparing that cost to alternatives. Figure 8 shows one example drawn from recent Navy analyses.

Figure 8. An example of efforts to determine the proper mix of Navy manpower[a]

- SAG Corporation: *Cost/Benefit Analysis of Navy Pharmacy Officer Manning* (April 2003)
  - Most efficient mix of Navy officer, civilian and contractor pharmacists against defined pharmacy workload
  - Showed that civilian pharmacists cheaper than officers or contractors
    - But current cost estimates ignore costs of dramatically increasing civilian recruiting
  - Officers most expensive, but used in many billets that are not military essential

a. Source: Dr. Pat Mackin, "Determining the Proper Mix of Navy Manpower: Lessons for Civilian Manpower Management," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [13].

Challenges to this type of analysis include capturing the true costs of each type of manpower and accounting for the impacts of any proposed changes on military rotational requirements and career progression. Dr. Mackin noted that cost tradeoffs depend heavily on the impact of potential changes on personnel flows. He also cautioned that workforce modeling must be integrated into the requirements determination process and that it may be more efficient to draw from other agencies' tools than from military models.

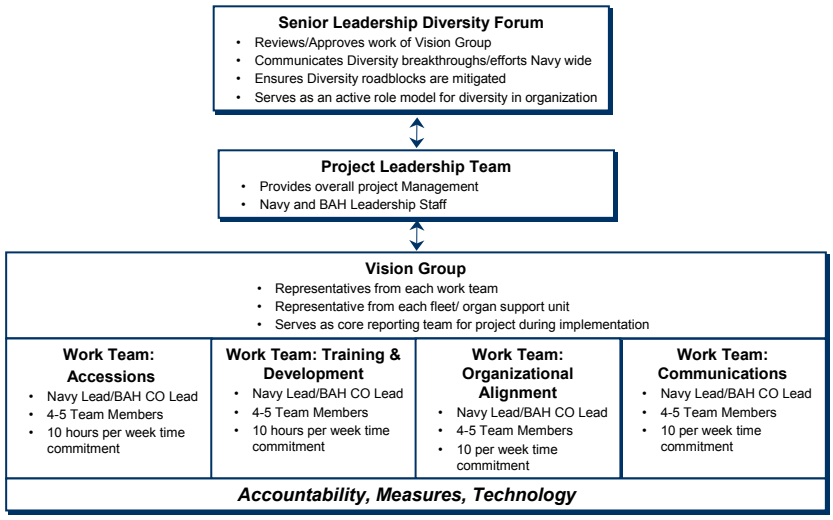
One important part of recruiting and retaining the "right person" is creating an inclusive environment that embraces diversity. Successful diversity management allows the military to compete for top talent and to tap the wealth of skills available across the nation, providing better combat readiness and mission responsiveness.

CAPT Syd Abernethy (PERS-OOJ) provided an update on the CNP-sponsored strategic diversity effort that he heads with support from Booz-Allen-Hamilton [14].

The effort's goals and strategies are aligned to four pillars for diversity: Accessions, Training and Development, Organizational Alignment, and Communication. The Accession goal is to improve recruiting efforts so that the Navy is recruiting a more diverse, qualified workforce within five years. The Training and Development goal is to embed the Navy's diversity vision in all Sailor and civilian leadership training and management tools. The goal of Organizational Alignment is to develop and maintain an organizational structure that ensures that diversity initiatives and programs are integrated and aligned within the Navy. The Communication goal is to inform and educate both internal and external audiences on the current diversity initiatives, programs, and opportunities. Each goal has associated strategies for achieving the goal.

CAPT Abernethy outlined the effort's implementation structure, which includes a senior leadership diversity forum, a project leadership team, and a vision group (see figure 9). The senior forum reviews/approves the work of the vision group, communicates diversity efforts Navy-wide, and ensures that diversity roadblocks are mitigated. The project team provides overall project management, while the vision group contains representatives from each work team and fleet/organ support unit. A work team exists for each of the four goals.

Figure 9. Implementation structure for the Navy's diversity effort[a]



a. Source: CAPT Syd Abernethy, "Optimizing the Navy's Diverse Force: A Strategic Approach," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [14].

CAPT Carol Schmidt, head of the Navy's Women's Policy Office (Pers-00W), addressed current and future gender issues in the Navy's workforce [15].

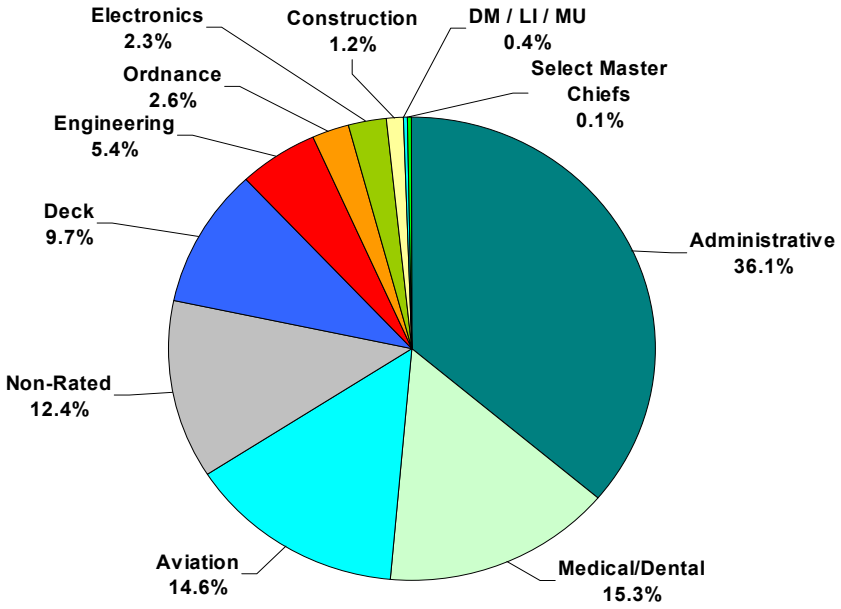
Women currently are restricted from serving on submarines and in PCs, Special Warfare, and support positions with USMC ground combat units. Despite this, the number of women in the Navy is increasing. CAPT Schmidt noted, however, that enlisted women are still concentrated in the less sea-intensive, traditional administrative and medical ratings (see figure 10).

The Navy has made an effort to classify more women into sea-intensive, technical ratings. In fact, the CNO's 2004 guidance sets a goal to increase the percentage of women in technical ratings by 2 percent annually.

CAPT Schmidt cautioned, however, that continued integration of women at sea requires careful attention to external forces. First, the Navy does not "prospect" for women; it takes those women who seek out the Service. Second, at-sea berthing for women drives the female

accession mission (which was increased this year to 19 percent). She noted that lack of funding limits the ability to modify berthing, although the Navy is now designing new ships with gender-neutral berthing. Third, recently drafted force reduction and billet conversion plans include abolishing a large percentage of shore administrative billets, which are predominately held by women. CAPT Schmidt urged that Navy leadership evaluate the impact of the proposed billet changes and develop a strategy to mitigate serious damage to women's career potential in the Navy. This strategy must include a gradual shift of women from shore-intensive ratings to more sea-focused occupational categories. She cautioned that, without resolution, the percentage of women in the Navy could decrease.

Figure 10. Distribution of female enlisted, by rating category[a]



a. Source: CAPT Carol Schmidt, "Diversity in the Navy: Gender Issues," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [15].

To gauge its progress toward achieving an inclusive climate, the Navy analyzes data from personnel surveys. Ms. Carol Newell (NPRST) presented 2002 results from the Navy Equal Opportunity/Sexual Harassment (NEOSH) survey, conducted biennially since 1989 [16].

The survey showed that perceptions of the equal opportunity (EO) climate have improved over time for all race/gender groups, but gaps still remain between whites and minorities and between men and women. More than 80 percent of all groups reported that they knew what was considered sexual harassment (SH). The survey showed that one-third of women officers and over half of enlisted women believed that SH is a problem in the Navy. Ms. Newell also noted that officers continue to be less likely than enlisted to attend EO, fraternization, and SH training. Figure 11 shows that the most frequently reported SH is crude or offensive behavior. These experiences may influence the decision to stay or leave the Navy.

Figure 11. SH behaviors experienced during the past year— enlisted respondents[a,b]

	Females		Males	
	1995	2002	1995	2002
Crude/Offensive Behavior:	*63%*	*64%*	*34%*	*30%*
Offensive sexual stories/jokes				
Unwelcome attempts to discuss sexual matters				
Offensive remarks on your appearance				
Offensive gestures/use of body language				
Unwanted Sexual Attention:	*43%*	*44%*	*8%*	*9%*
Unwanted attempts to establish romantic relationship				
Continued unwanted attempts for dates				
Unwanted touching				
Unwanted attempts to stroke, fondle, kiss you				
Sexual Coercion:	*13%*	*15%*	*2%*	*2%*
Bribes for rewards for sexual favors				
Treated badly for refusing sex				
Threats for not being sexually cooperative				
Implied faster promotion, etc. if sexually cooperative				

a. Source: Ms. Carol Newell, "Key Findings of the 2002 Navy Equal Opportunity Sexual Harassment (NEOSH) Survey," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [16].

b. 1995 data are based on DMDC recalculated rates for the Navy. Multiple responses were allowed.

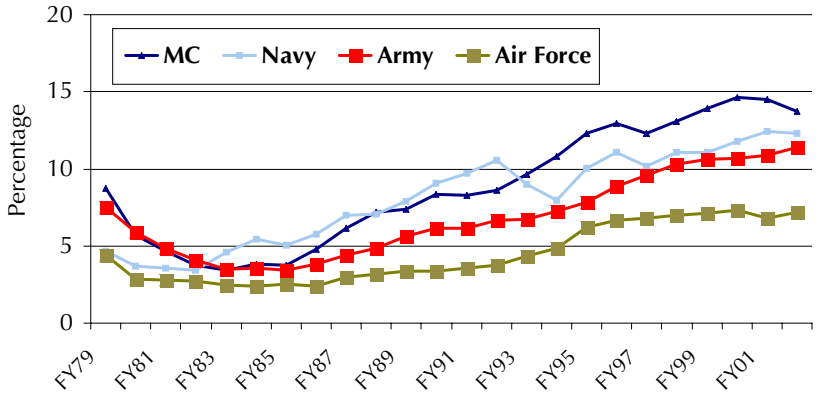
The NEOSH survey's primary focus has been EO, discrimination, and SH. Ms. Newell observed, however, that leadership's emerging diversity strategy meant that the survey needed to be reengineered to capture the effectiveness of this effort. As such, the 2004 Navy Officer

Survey covers a wide range of diversity and career issues: mentoring, retention, valuing diversity, professional development, and career satisfaction.

Indeed, the military is making great strides in increasing diversity. Ms. Anita Hattiangadi (CNA) reported on one Service's success story—the success of Hispanic recruits in the Marine Corps [17].

The Marine Corps has been very successful at recruiting Hispanics (the largest and fastest-growing minority population), and Hispanic recruits do extremely well in the Marine Corps (see figure 12). Ms. Hattiangadi noted that Hispanic bootcamp and first-term attrition rates are substantially below average rates for other groups. These results, which hold up even when controlling for other differences, suggest that some unmeasured characteristics (proxied by Hispanic origin) explain these differences.

Figure 12. Hispanic enlisted recruits as a percentage of all recruits[a]



a. Source: Ms. Anita Hattiangadi, "Recruiting Hispanics: The Marine Corps Experience," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [17].

Her field work analysis suggested some possible reasons for lower Hispanic attrition, such as reluctance to disappoint family and friends and unwillingness to treat the enlistment opportunity lightly. The Marine Corps also emphasizes core values and describes itself as a family—an identification that seems especially attractive to Hispanic recruits.

Ms. Hattiangadi highlighted several challenges that may affect the Services' ability to recruit Hispanics in the future—including high dropout rates, language fluency of recruits and their parents, and citizenship status—and recommended actions that DoD can take to ensure the continued success of Hispanic recruits. Her recommendations included supporting a stay-in-school campaign, urging the federal government to raise the minimum age for taking the GED exam, translating recruiting brochures, and providing information about expedited citizenship.

Right place

Ensuring that manpower is in the right place requires an improved understanding of requirements. As Dr. Peggy Golfin (CNA) noted, such an understanding can be used to determine the proper sea/shore mix of Navy jobs [18].

She described her work assessing the extent to which technology could replace or move ashore a limited number of functions, using results from the Improving the Navy's Workforce (INWF) initiative. Launched in June 2002, INWF is a comprehensive review of Navy enlisted ratings, including the identification of the knowledge, skills, abilities, and tools Sailors need to do their jobs. Using the occupational taxonomy developed in the first phase of the project, Sailors will complete surveys indicating time spent on each identified task in the project's second phase.

Using 25 Navy ratings in two job families (counselor and 3M) and their associated task-level data as test cases, Dr. Golfin asked subject matter experts (SMEs) to identify tasks that they felt could be replaced or moved ashore within the next five years.[3] Figure 13 shows preliminary results.

The analysis faced several challenges. First, the survey had a low response rate (five ratings had only 1 respondent, two ratings had only 2 respondents, and some ratings received no responses). Even those

3. SMEs included personnel in SYSCOMs, COMNAVSECGRU, N00T, N13, Centers, and HPC.

ratings that had an adequate number of responses failed to reach a consensus on which tasks could be moved or replaced. Second, Sailors tended to respond only regarding the platforms with which they were familiar, so saying that a task could not be moved or replaced does not necessarily mean that it could not be. Finally, it was unclear what was meant when respondents said a particular task could be moved *and* replaced for the same platform.

Figure 13. Identifying opportunities to move billets ashore: preliminary results[a]

Rating/Job Family	Number of Respondents*	Number of Tasks	Move	Replace	Replace and Move	Total	%
3M	1	68	3	3	0	6	9%
ABF-Below Deck	3	314	37	203	1	224	71%
ABF- CVN Flight Deck Operations	2	223	6	113	0	119	53%
ABF-L-Class Flight Deck Operations	2	225	29	94	9	112	50%
AN	1	36	0	9	0	9	25%
CTA	1	208	1	0	10	11	5%
CTO	1	136	19	16	0	35	26%
CTR	1	228	43	5	2	50	22%
MS	3	364	45	72	3	98	27%
PC	3	313	124	61	0	174	56%
SK	6	178	108	47	39	131	74%

a. Source: Dr. Peggy Golfin, "Improving the Navy's Workforce: Identifying Opportunities to Move Billets Ashore," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [18].

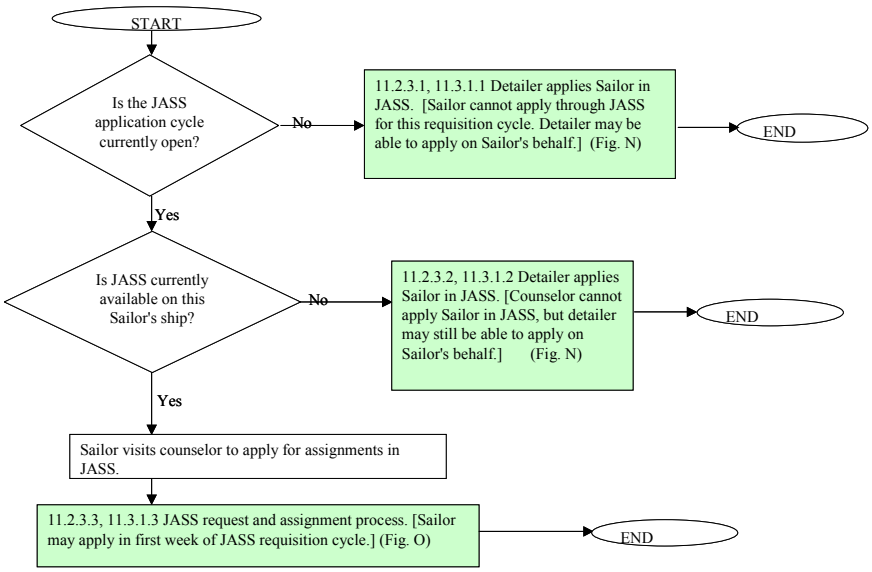
In the next phase of the study, Dr. Golfin will seek input from Human Systems Integration (HSI) and/or acquisition experts. Ultimately, these findings, when combined with results from Sailor Task Surveys that will be deployed as part of the larger INWF initiative (which will ask about time spent on tasks and frequency of execution) will allow the Navy to estimate the manpower savings that could accrue if particular tasks were replaced or moved ashore.

To better assign personnel to "the right place," researchers are developing tools to automate some assignment functions. To support this effort, Mr. Ken Robinson (RCI) analyzed the current Navy enlisted assignment system [19].

He asked detailers from each rating community several questions, including how they determine the right Sailor for a particular job, when "slams" occur, and what expert knowledge they use. He also asked EPMAC placement coordinators from various communities about Command influence in the detailing process, what Commands look for in Sailors, and the importance of such factors as arrival time, paygrade, and NEC.

Mr. Robinson found that much of the detailing decision process is not formally documented. So, based on his interviews, he created process flow diagrams representing Navy detailers' procedures (see figure 14) and devised entity relationship diagrams to outline relationships between people, policies, Navy agencies, computer systems, and other assignment process elements.

Figure 14. Assignment process flow chart[a]



a. Source: Mr. Ken Robinson, "Deciphering Enlisted Assignment," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 29, 2004 [19].

His analysis uncovered several important assignment factors that would not be apparent from just a review of Navy documents. For example, highly technical ratings place more importance on NEC reuse than paygrade, whereas other communities (such as BM and CB) more heavily value paygrade. He also found that things like cost, the current number of Sailors in a particular community, and promotion schedules vary detailers' decision-making processes over time. Detailers also handle many special situations (e.g., Exceptional Family Members, spouse co-location, female berthing spaces) on a case-by-case basis.

The work will be used to guide the creation and functionality of an automated assignment tool, which developers hope will have a more realistic perspective than an assignment tool based solely on Navy documentation.

Right number

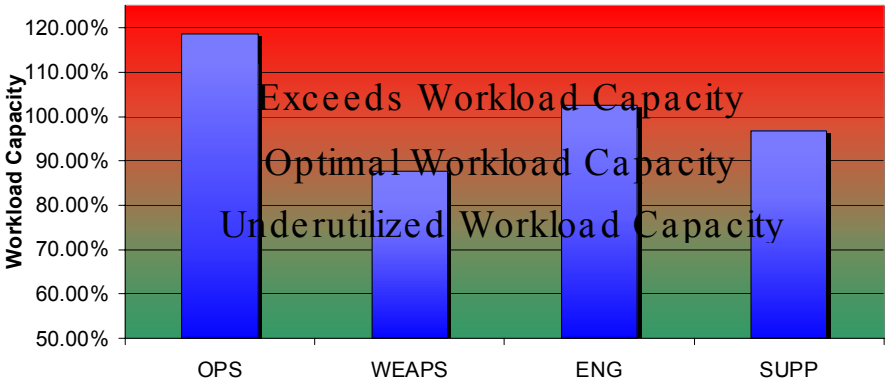
The Navy Manpower Requirements System (NMRS) provides budget and program managers with a static accounting of afloat asset manpower requirements based on workload assessed at the highest level of readiness. LCDR Troy S. Taylor (USCG) presented a set of MS Excel© tools using NMRS workload data that assess the impact of resource allocation decisions on crew workload capacity [20].

LCDR Taylor noted that each asset's funded manpower contains a measurable workload capacity; operational directives and maintenance doctrine define maximum operational capacity. When manpower resources fall short of total workload requirements, funded manpower must function at high levels for long periods to meet operational and maintenance workload requirements—stressing certain components (see figure 15). This affects crew's quality of life, retention, and safety; increases the probability of system failure; and reduces an asset's life span.

According to LCDR Taylor, these new tools will allow commanding officers, budget officers, and program managers to track the results of programmed manpower decisions, conduct pre-deployment workload capacity assessments, identify stressors, balance operations, identify training windows, maximize crew rest, forecast administrative and

maintenance degradation rates, and provide supporting data for intermediate asset life-cycle manpower resource adjustments. They also will provide opportunities to mitigate, prioritize, and manage workload capacity by division afloat and in port, allowing for improved optimal manning decisions, reduced total ownership costs, and increased operational effectiveness.

Figure 15. Sample workload tool outputs: 56 Day Patrol @ 50% FQ & 50% Small Boat Sorties (USCG WHEC 156 RQMT/137 COB)[a]



a. Source: LCDR Troy S. Taylor, "The Impact of Resource Allocation Decisions on Crew Workload Capacity: In Search of a Common Denominator for Manpower Requirements Management," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [20].

The Chief Warrant Officer (CWO) community has a long history of serving the U.S. Coast Guard (USCG); however, recent technological changes, mission expansion, and changes in the enlisted rating structure have changed the number of CWOs required and the work that they perform. Mr. Jonathon Mintz (CNA) and Mr. Robert Hausmann (CNA) reviewed the CWO specialties to determine their current scope of work [21]. Their results, taken together with those from other ongoing analyses, will allow the USCG to make informed decisions about the structure of the CWO specialties, occupational paths from enlisted to CWO to the junior officer ranks, and the roles of CWOs within the various specialties.

With the participation of incumbent warrant officers, senior enlisted, and junior officers, the researchers applied a web-based methodology to more precisely understand the work that incumbents perform and the specific competencies required. Senior officers and program managers described future USCG missions and their potential impact on CWO work.

Based on this analysis, the researchers recommended establishing a new Marine Safety specialty. Other recommendations included exploring suitable career paths for the IT community, adding a new source rating for the COMM specialty, training CWOs in Personnel Management and Business Administration before accession, and providing specialty training in competencies that are not covered through enlisted experience.

The Navy also is trying to improve its requirement-setting process so that it better incorporates Human Systems Integration (HSI). Dr. Jennifer McGovern Narkevicius (NAVAIR/ARINC Engineering Services, LLC) and Ms. Karen Yates (NAVAIR 4.6) noted that the Systems Engineering, Acquisition, and Personnel Integration (SEAPRINT) initiative integrates several diverse disciplines within HSI—human engineering, manpower, personnel, training, systems safety, occupational health, personnel survivability and habitability [22].

Defining requirements is difficult because there are many variables and traditionally little concrete evidence and little solidarity in the human-related disciplines. The researchers noted that the current requirements process is reactive, so that demand signals occur too late. They described SEAPRINT, which is envisioned to be the Navy's parallel to the Army's Manpower and Personnel Integration (MANPRINT), as a single, integrated process that addresses all aspects of HSI—from capability definition through personnel delivery (see figure 16).

Dr. Narkevicius and Ms. Yates contended that SEAPRINT will eventually standardize requirements/processes across the Navy and DoD, and already identifies tools that are useful for Navy application. The developers hope that SEAPRINT will result in less redundancy, lower acquisition cost, more integrated solutions, better return on investment, and reduced management overhead.

Figure 16. Outline of a SEAPRINT program[a]

1. HSI Initiated Early
2. Recognition of Issues – Plan for Resolution
3. Documented Performance Requirements
4. Integrated Technical Process
5. Proactive Trade-offs During Design
6. HSI as a Factor in Source Selection
7. SEAPRINT Milestone Assessments

a. Source: Dr. Jennifer McGovern Narkevicius and Ms. Karen Yates, "SEAPRINT: The Navy's Enterprise Approach to HSI," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [22].

How to best set requirements is not just a military issue. In fact, the Internal Revenue Service (IRS) has recently begun to develop a manpower requirements process modeled on the military's approach. Ms. Christina Handley (IRS) and Ms. Kimberly Darling (SAG Corporation) described their work testing the process using an organization within IRS's Large and Medium Sized Business operating division [23]. Like other government workforces, a significant share of the IRS workforce is retirement-eligible. In addition, there have been periods of "binge hiring" over time—creating workforce imbalances (see figure 17).

The Integrated Workforce Planning System (IWPS) is a multi-stage planning and analysis model that includes a variety of workforce parameters and integrates related budget and planning data. The model's outputs include a multi-year staffing plan and detailed estimates of retirement and attrition by division and occupation. It also estimates internal transfer and reassignment of personnel driven by budget allocation and workforce losses external to the IRS. IWPS can account for the time it takes new employees to reach full performance levels, and includes information on policies, guidelines, and workforce dynamics.

Figure 17. Key IRS occupations' years of service and grade profile[a,b]

a. Note: Key occupations include: 512 (RA), 526 (TS), 1169 (RO), 1811 (SA), 334 (CS). Executive and Sr. Mgrs included.

b. Source: Ms. Christina Handley and Ms. Kimberly Darling, "Workforce Planning, Analyses and Measures," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [23].

IWPS information has proved useful to managers, recruiters, and budgeteers. During budget execution, it is used to assess and evaluate performance and outcomes. This success has led to broader initiatives. Recently, IRS established an Organizational Change Program Office to create a Service-wide process for projecting and tracking organizational changes.

The "right number of people" may sometimes mean reducing the number of those brought into the organization. Dr. Albert Monroe (CNA) described his work on the cost savings from reducing the number of Surface Warfare Officer (SWO) accessions [24].

The Navy officer personnel system currently allows officers to lateral transfer from one community to another during their careers. It is particularly common for officers to transfer from the unrestricted line (URL) to the restricted line (RL) and some selected Staff communities within the first five or six years of service.

To accommodate this flow of lateral transfers, the URL communities access and train more officers than are necessary to meet their requirements. These additional junior officers can reduce the quality of training and readiness, while increasing endstrength and costs.

Dr. Monroe finds that a cut in SWO accessions from 780 to 620 would be cost-effective—saving $91 million per year in personnel costs by reducing junior SWO endstrength (see figure 18). The cut would reduce the number of laterals from Surface to RL/Staff communities by 35 percent, increasing RL/Staff direct accessions by 47.

Figure 18. Reducing SWO accessions saves money[a]

SWO Accessions	Net Annual Cost Savings ($M)	Implied SWO Bonus	Total Strength YOS 1-9	Total Cost SWO + RL YOS 1-9 ($M)	Average YOS (1-9)
780	$0	$50k	10,028	$1,239	4.55
700	$46	$67.5k	9,647	$1,198	4.58
620	$91	$90k	9,259	$1,159	4.60

Cutting SWO accessions to 620 saves $91 million by reducing strength by about 750

a. Source: Dr. Albert Monroe, "Enabling Officer Accession Cuts While Limiting Laterals," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [24].

Although the cut would reduce the number of warfare-qualified officers in RL/Staff communities by 448 (about 4 percentage points), he calculates that a warfare-qualified officer in the RL and Staff corps would have to be worth about $200,000 more than a non-warfare-qualified officer in the same billet for the current number of SWOs accessed annually to be cost-effective.

One potential issue is that the cut would reduce the number of RL/Staff officers at YOS 9 by 4 percent, which could present a problem if

demands for control grade officers increase due to increased joint demands. Dr. Monroe noted, however, that the number of control grade officers could be increased relatively inexpensively by instituting an RL bonus.

Accession cuts are not always the best way to shape the force. As Mr. Paul Hogan (The Lewin Group) noted, the Navy needs a permanent tool—Transition Incentive Pay (TIP)—that is flexible and useful for the smaller-scale, targeted force shaping that will be needed in the future [25].

Mr. Hogan observed that previously used force-shaping tools (VSI/SSB/TERA) offered little flexibility in the size of the buyout, and authorities for them expired several years ago. But using involuntary separation tools (such as Selective Early Retirement or Reduction in Force) is extremely costly—creating negative morale and lowering long-term retention.

TIP should be voluntary, flexible, and cost-effective—covering a wide range of force-shaping issues and allowing quick response to problems. Mr. Hogan also noted that it must be targeted so that it keeps the best people and does not become a reward for poor performance.

Several decisions first must be made regarding TIP, including how prices will be set, how eligibility will be determined, and how payments will be made. Figure 19 shows several possible options for each of these.

Workforce shaping is not just a military issue. Mr. Hogan and Dr. Carol Moore (The Lewin Group) described their efforts to model employee separation behavior using Internal Revenue Service (IRS) data [26].

In an attempt to avoid layoffs, the IRS began offering buyouts through the Voluntary Separation Incentive Payment (VSIP) program in December 2000 (see figure 20). Buyouts were part of a strategic workforce plan implementing the IRS Restructuring and Reform Act of 1998, which also included having managers compete for jobs, increasing opportunities for employees to train for new positions, and offering more attractive pay to qualified managers.

Figure 19. TIP design considerations[a]

- Price-Setting Mechanism
  - Fixed (e.g., VSI/SSB)
  - Adjustable (e.g., Selective Reenlistment Bonus)
  - Auction-based (e.g., Assignment Incentive Pay)
- Eligibility Determination
  - Targeted to define just the population of interest
  - Adjust timing, eligibility window
- Payment Philosophy
  - Lump-sum vs. annuity
  - TSP provisions
  - Other benefits

a. Source: Mr. Paul Hogan, "Designing a Military Force Shaping Tool," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [25].

Figure 20. How the IRS Implemented Variable Separation Incentive Pay[a]

- Payment maximum is $25,000 lump sum
- No explicit threat of layoff in most cases—reassignment emphasized instead
- Target workers whose positions don't fit into restructured organization—"transition employees"
- Two types of VSIP offerings:
  - Direct buyouts—transition employees
  - Indirect buyouts—other workers, whose acceptance would create a vacancy for a transition employee

a. Source: Mr. Paul Hogan and Dr. Carol Moore, "Restructuring the IRS Workforce: The Impact of Employee Buyouts," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [26].

The researchers used IRS buyout data to estimate an econometric model of employee separation behavior—comparing retention rates among eligible employees during the buyout period (December 2000

through June 2003) with retention rates during the pre-buyout period.

Identifying eligible employees was difficult because the list of transition employees that the IRS provided was incomplete. This required the researchers to extrapolate the size of the population, based on policies governing buyout eligibility. "Eligible" employees were those who had the same combination of occupation, paygrade, and commuting area as those on the transition employee list.

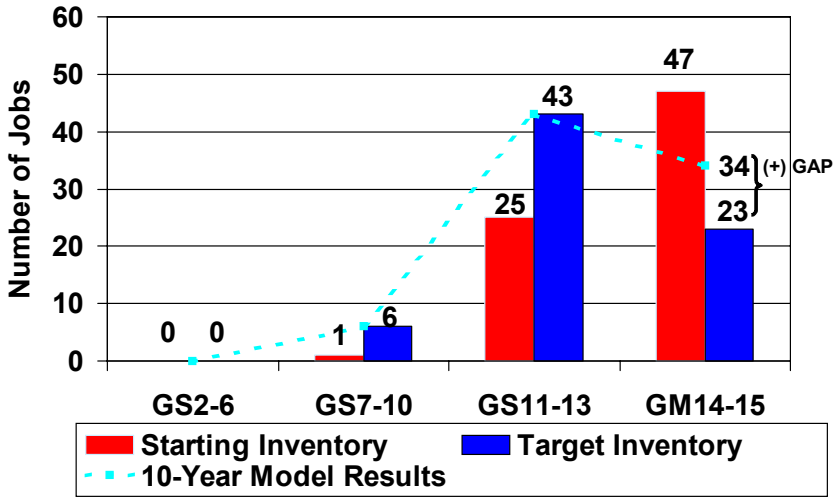
The researchers find that offering VSIP resulted in a statistically significant increase in separations. Had the IRS not offered buyouts, retention among VSIP-eligible employees would have been 3.9 percentage points higher. This means that VSIP resulted in over 1,000 additional separations. But, the researchers cautioned, 2,700 people who took the bonus would have left anyway. They also stressed that VSIP's impact is small compared with many other retention drivers, most notably, eligibility for an immediate retirement annuity. They noted that lessons learned from this study can guide future analysis of separations bonuses' effects on the behavior of Navy civilians.

As Dr. Tony Durso (RCI) noted, cutting personnel without a clear understanding of the implications can be risky [27]. In recent years, the federal payroll has been cut to its lowest level since 1950. Unfortunately, downsizing was achieved through across-the-board cuts, not through targeted reductions aligned with agency missions. The result is a smaller influx of people with new knowledge, energy, and ideas, and more hierarchical layers. The average age of the federal workforce has increased from 42 to 46 in the last 10 years; in fact, almost half is retirement-eligible in the first decade of the 21st century.

Dr. Durso described a mathematical model that he and his team are developing to help federal agencies plan the future civilian workforce. It provides an integrated approach to manpower planning and human capital management using accepted operational research techniques. The model, which can be constrained by personnel budgets, matches people to jobs, calculates annual gains by grade (grade band) and skill, provides annual promotion requirements by grade (grade band) and skill, identifies the need for additional loss mechanisms, and provides other capabilities, as needed.

Dr. Durso presented some preliminary model results (see figure 21). The figure shows (given the estimated behavior of people) the best results that can be achieved without any additional loss programs. Starting in period 1, there were 47 GM 14-15 in the 1102 series. After 10 years, you could expect to have 34 still on board. Therefore, a target of 23 is unrealistic unless additional loss programs are created.

Figure 21. Scenario for the Contract Specialist (1102) series[a]



a. Source: Dr. Tony Durso, "An Innovative Approach to Human Capital Planning and Management," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [27].

Work processes

Work processes, or "how people get things done," are an important element of any human resource strategy. Researchers presented results from several efforts focused on streamlining or improving work processes to better meet the needs of the Navy and its customers.

Dr. Greg Trafton (NRL) described the impact of "interruptions" on people's ability to resume a particular task [28]. A recent study shows that Navy weather forecasters experience interruptions as frequently as every 80 seconds over a two-hour period, and that these interruptions directly affect the accuracy of their forecasts.

Dr. Trafton and his team have developed a computational and mathematical theory, called Memory for Goals, that explains why interruptions are so disruptive. Simply put, the theory relates time away from a task to its ability to be resumed—the longer a person is diverted from a task, the harder it will be to resume it later. The rate of "memory decay," which will depend on a variety of factors,[4] can be quite high. Dr. Trafton notes that most people forget what they were previously doing in as little as 15 seconds!

The researchers find that creating environmental cues (e.g., writing down what you planned to do next or leaving your cursor where you left off) can lessen the effects of interruptions. In an experiment, his team found that doing so shortened the resumption lag by several seconds (see figure 22). To avoid adverse effects, Dr. Trafton recommends avoiding interruptions altogether (e.g., turning off automatic e-mail alert or chat features) or creating environmental cues that will facilitate resumption of the task later. He noted that, in the future, general software applications will show a user what he or she had just finished and what the user's next action is likely to be.

4. For example, whether the person prepared for resumption of the task, how well the person knows the task, or how awake the person is.

Figure 22. The effect of environmental cues on task resumption lag[a]

a. Source: Dr. Greg Trafton, "Reducing the Disruptiveness of Interruptions," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [28].

Technology also can help to streamline work processes. Col Paul D. Bennett (USMC) described the Total Force Administration System (TFAS)—the Marine Corps' enterprise-wide initiative to move pay and personnel administration to a mostly self-service, virtually paperless, web-based environment [29]. Marine Online (the TFAS web component) provides global access to pay, personnel tools, and personal information in a secure environment. It gives all Marines direct access to the Marine Corps Total Force System—a fully integrated military personnel and pay system. Members can view and self-certify changes to their official master records (e.g., home address, gas mask size). They also can view awards, basic training records, military and civilian educational records, and historical performance data. Col Bennett believes that TFAS could be adjusted to include all the Services and possibly replace software currently used.

Col Bennett noted that the Marine Corps' FY04 focus is fielding a workflow capability that allows Marines to initiate and execute administrative processes in a web-based environment with direct, automated input into MCTFS. A commander decides who approves transactions

by assigning permissions. The server is centrally located, so commanders do not incur local server maintenance costs and do not need to have local system expertise. Other TFAS capabilities scheduled for FY04 include the automation of the Performance Evaluation System, the ability to view Official Military Personnel Files on-line, and a training event reporting module.

TFAS Bundled Capabilities Package (BCP) One reengineered the administration of leave, morning report submission, proficiency and conduct mark reporting, submission of promotion recommendations, and the design of custom reports. Future BCPs will connect work flow between individuals and HQMC and will add additional processes to the baseline architecture.

The system has been quite successful so far (see figure 23). Based on several criteria (including cost savings and avoidance, improved quality of life and mission readiness, and the potential to benefit a broad user base), TFAS received a Government Computer News Award, a Department of the Navy eGovernment Award, and the Department of Defense Chief Information Officer's award in 2003.

Figure 23. TFAS successes to date[a]

- **Self-service**
  - **500,000 transactions since 20 September 2002**
  - **Approximately $3 million in cost avoidance over manual processing**
  - **Increased accuracy of data**
- **Unit capability**
  - **Currently two battalions (over 2,500 Marines)**
  - **3,755 unit leader transactions (1,245 annual leave) without one administrator touching paper**
  - **Six additional units will be activated by the end of April**

a. Source: Col Paul D. Bennett, "Total Force Administration System," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [29].

The Navy also is undertaking an effort to streamline work processes—in this case, the management of recruiting incentive programs (Enlistment Bonus, Navy College Fund, Loan Repayment Program, National Call to Service, and Non-Prior-Service Basic). Mr. Gary Ton (Navy Recruiting Command, N5311) described CNRC's efforts to account for nearly $202.9 million in obligations incurred since FY01 and better manage its recruiting incentive programs [30]. He noted that the enlistment bonus is CNRC's most expensive compensation tool, yet about 25 percent of these bonuses are not properly paid.

Along with other instructions, USC Title 37 Section 309 stipulates that enlistment bonuses are to be paid, either in lump-sum or periodic payments, only when participants have completed some or all of their pipeline training (which can be as long as 24 months). However, no integrated system exists that can manage recruiting incentive programs from the point of obligation to payment.

CNRC is sponsoring the development of a tracking system that will allow program managers to manage all phases of the enlistment incentive program. Figure 24 shows some of its eventual benefits.

Figure 24. Benefits of improved management of recruiting incentives[a]

- Saves countless man-hours (fleet wide) in recording, processing, tracking, paying, and accounting for EB funds
- Enables complete FY and Monthly reconciliation of MPN accounts
- Enables more optimal use of incentive resources
- Saves millions in bonus overpayments
  - Ref. Center For Naval Analyses study APR2003
- Provides high quality database from which to perform research and analysis
  - Ref. Center For Naval Analysis Study APR2003

a. Source: Mr. Gary Ton, "Managing the Navy's Recruiting Incentive Program," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [30].

When fully developed, the tracking system will collect information from various accession management and training systems and use this information to automatically pay incentives directly to Sailors based on completion of their approved pipeline training, track execution of incentives over payment cycles by categories, and meet standards of accounting in planning and budgeting of government funds. This will result in such benefits as reduced man-hours, better use of resources, and new research databases.

The initial phase of MILITAPS, the integration of the recruiting and training data system, has been completed and is accessible via the web. Enhancements to improve its accuracy will be completed by September 2004.

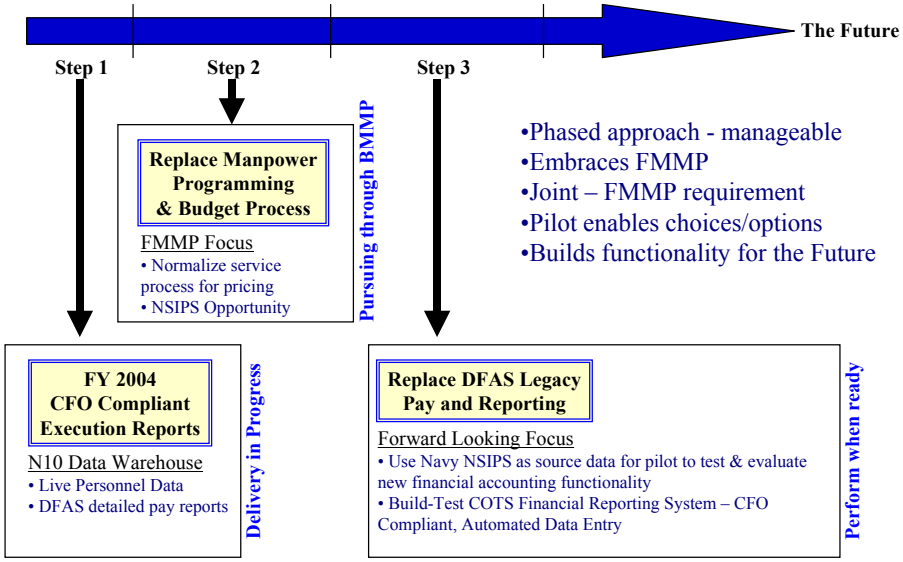
The Navy also is pursuing a strategy to improve the budgeting, programming, and application processes. Mr. Ilia Christman (NPRST) discussed the Manpower Enterprise Financial Strategy and displayed screen shots of the N-10 Data Warehouse's views and capabilities. [31]. The Warehouse is being beta-tested, and requirements for the next iteration of improvements are being collected.

Mr. Christman noted that current budgeting, programming, and application processes are not efficient. He said that there is no automated linkage between top manpower metrics and related program management, program management is not based on near-time data, and there is no ability to perform granular programming or obligation and expenditure monitoring.

The goals of the effort he described are to increase accuracy in budgeting and managing the MPN appropriation, decrease overhead cost by reducing the number of systems, build flexibility into new architecture, and build for the future. Mr. Christman described the strategy developed to achieve these goals (see figure 25).

Several financial management software initiatives also are underway. Mr. Christman said that they are in the process of completing the software assessment for a programming and budgeting pilot and are teaming with DFAS to identify legacy accounting systems for replacement of ICW-forward compatible pay.

Figure 25. Strategy for achieving goals of enterprise solution[a]



a. Source: Mr. Ilia Christman, "N-10 Data Warehouse," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [31].

Managerial structure

Managerial structure—how an organization directs and organizes the work of its personnel—is a key component of a coherent human resource strategy. Without an understanding of the managerial structures being used, there is little ability to identify areas where personnel management or the policies governing personnel management within the organization could be modified and improved.

In fact, several of this year's conference presentations challenged policies affecting the management of personnel. One presentation challenged the current length of the active duty obligation for physicians; another challenged the length of officer assignments.

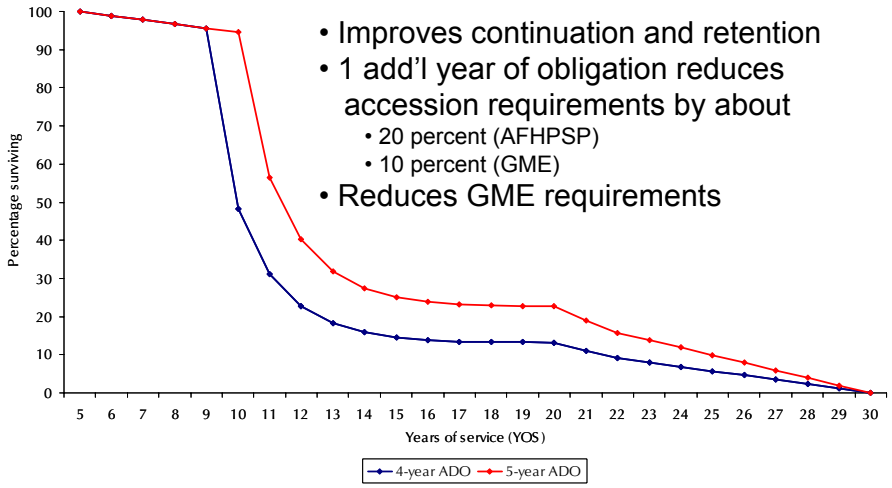
Dr. Eric Christensen and Ms. Shayne Brannman (CNA) described their work estimating the effect of lengthening the active duty obligation (ADO) for the medical corps [32]. Using regression analysis, they found that lengthening the ADO by one year would increase continuation and retention (see figure 26), thus reducing accession and training requirements. They also found that the applicant pool would support a one-year ADO increase.

These researchers noted, however, that there are systematic differences between how certain types of physicians would react to an ADO increase, potentially changing the mix of applicants to the Armed Forces Health Professions Scholarship Program (AFHPSP) and the Graduate Medical Education (GME) program. They conclude that lengthening the ADO by one year for the medical corps would be cost-effective, but other changes would have to be made to the AFHPSP and GME programs to avoid overmanning.

Dr. Margaret Harrell and Dr. Harry Thie (RAND) discussed their work challenging the length of assignments for general and flag officers [33]. Recently, the Secretary of Defense has expressed concern that assignments for general officers in the Army, Air Force, and

Marine Corps and assignments for flag officers in the Navy are too short, that the amount of service after promotion is too short, and that officer careers are not sufficiently long.

Figure 26. Impact of longer active duty obligation on medical corps' accession and training requirements[a]



a. Source: Dr. Eric Christensen and Ms. Shayne Brannman, "How Does DoD Determine a Reasonable Active Duty Obligation?" presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [32].

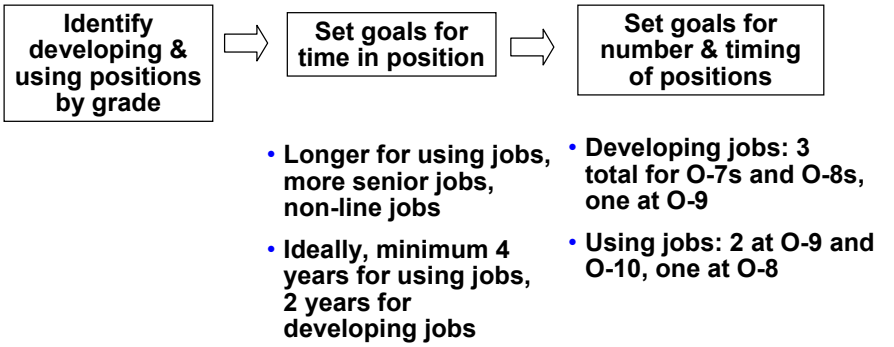
To examine these issues, the researchers first made a baseline assessment of general and flag officer career paths and then analyzed how changes to current management practices would affect general and flag officer assignments. They analyzed general and flag officer promotion patterns and management from 1975 to 2002, reviewed how private-sector organizations manage their senior executives, modeled and assessed different management paradigms and the resulting policies and practices, and interviewed senior military officers to capture their understanding of the current system and likely behavioral responses to a changed system.

Dr. Harrell and Dr. Thie pointed out that private-sector and military careers are managed quite differently. In the private sector, early jobs are developmental, later jobs are use-oriented, and longer tenure is

correlated with higher organizational performance. In the military, each Service has developmental and use-oriented jobs, but assignment lengths do not vary accordingly. In fact, even those in high-level jobs have relatively short job tenures.

The researchers proposed changing the management system so that assignment lengths are based either on the qualities of different positions or the way in which these assignments are used to develop officers. Consequently, they concluded that some, but not all, general and flag officer assignments should be longer. They also recommended creating a goal for the number and type of positions that a general or flag officer should hold (see figure 27).

Figure 27. A proposed career model that emphasizes time in job[a]



a. Source: Dr. Margaret Harrell and Dr. Harry Thie, "Developing and Using General and Flag Officers," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [33].

To support these changes, they recommended (a) varying mandatory retirement and time in grade regulations so that officers can have longer careers, (b) modifying laws currently regulating assignment management to allow for greater flexibility, and (c) changing compensation rules so that general and flag officers are not penalized for longer careers.

Other presentations demonstrated tools that have been developed to examine the effects of changes in managerial structures or policies.

As Ms. Kimberly Crayton (NPRST) noted, business practices, threat conditions, and other policy constraints (DOPMA, OPA) affect Officer Community Management [34]. Current manpower planning tools reasonably forecast paygrade and length-of-service distributions, but do not provide career-milestone level information.

She described a career path simulation model that has been developed for several URL communities, including Surface Warfare Officers (SWO), Submariners (SUB), and Aviators (AVI). The model assists with career-milestone level inventory planning, simulates career progression within billet constraints, and shows the impact of changing community management policies. It uses Discrete-Entity Simulation to project the community's structure at the career-milestone level—thus improving planning and giving community managers a deeper understanding of community issues. This allows them to address several important issues, such as whether the number of department heads (DH) or joint duty specialists will be adequate in the future or whether changing DH tour lengths will affect Executive Officer opportunities.

Mr. Rodney Myers (NPRST) described efforts to build an enterprise model for the Navy's personnel system [35]. An enterprise model is a computational representation of an organization's structure, activities, processes, information, resources, people, behavior, goals, and constraints. It can be both descriptive and definitional—spanning the "as is" and/or the "to be." Its role is to achieve model-driven enterprise design, analysis, and operation.

To build its prototype model, NPRST chose to use System Dynamics—a method for analyzing organizations that are constantly changing. System Dynamics takes information about a system's structure that normally remains hidden in mental models and formalizes it into a computer model. Mr. Myers believes that this method is very useful for representing the complex feedback behavior of managing the Navy's personnel system.

Upon successful completion, Mr. Myers hopes that tools developed using this methodology will provide decision-makers with an interactive analysis system to facilitate strategic planning. He said that this model will allow functional managers to explore the impact of

changes in functional policy or resource decisions across the entire personnel enterprise. For example, how would relaxing recruiting standards affect the quality of Sailors throughout the enterprise? How would shortening or lengthening time in the DEP affect fleet attrition? Figure 28 shows some possible scenarios, model adjustments, and metrics. The goal is to create a more effective personnel environment through strategic evaluation of potential futures.

Figure 28. Enterprise model scenarios and analysis[a]

Scenario	Model Adjustment	Metrics
The Navy intends to cut approximately 40,000 officers and enlisted personnel over six years to gain the money needed to buy new, more efficient and more capable aircraft and ships.	**(1) The "end-strength requirement" will be reduced by 40,000 in various increments, (2) Adjust recruiter productivity, (3) Adjust DEP contract length, (4) Adjust economic conditions (average, good, bad), etc.**	**(1) Operating costs, (2) cumulative gap, (3) gains, (4) losses, (5) Work Year Average, (6) Inventories, etc.**
What is the impact on DEP attrition if the Navy were to reduce the "DEP contract length"?	**(1) Adjust the nominal DEP contract length, (2) Adjust the end-strength requirement, (3) Adjust economy conditions (average, good, bad), etc.**	**(1) DEP attrition, (2) cumulative gap, (3) gains, (4) Operating costs, (5) Work Year Average, (6) Inventories, etc.**

a. Source: Mr. Rodney Myers, "Enterprise Modeling—A System Dynamics Approach," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [35].

Mr. Richard Loffredo (CSC) and Mr. Sanjay Nayar (CSC) described how the framework underlying the Skilled Personnel Projection for Enlisted Retention (SKIPPER-III) tool could be used to manage a variety of manpower processes [36].

SKIPPER-III, an easy-to-use, web-based model, currently is used extensively for enlisted community management and analysis related to skill-level inventory projection and accession/A-School planning.

Underneath SKIPPER is an integrated, expandable Navy Personnel Modeling Framework with such features as multi-year inventory

projection, powerful scenario management, master file-based historical data that can be easily overridden, recruit/A-School optimization and conversion planning, and an initial All-Navy LOS force strength planning capability.

Mr. Loffredo and Mr. Nayar are working on prototypes that will leverage this framework as the research and analysis platform for sea/shore rotation modeling/optimization, advancement modeling improvements, C-School planning, skill reutilization, SRB planning and justification, and expanded All-Navy capabilities. Since SKIPPER models at the detailed skill level, it can be used for skill rollup and reconciliation with All-Navy Strength Planning. It also facilitates force shaping and tradeoff analyses, training analyses, cost/ROI analyses, and alternative policy analyses.

Information and knowledge

Providing information to Sailors is an important thrust of the Navy's efforts to disseminate information and knowledge. The web-based human resource system, Sea Warrior, will eventually provide many capabilities—self-service career growth and training opportunities for Sailors, better input into the distribution process for commands, and enterprise management capabilities for the Navy. Mr. Ricky Hall (NPRST) described how Sea Warrior will help the Navy achieve several of the CNO's priorities, including better alignment, quality of service, manpower, and current and future readiness [37].

Mr. Hall noted that Sea Warrior aligns human resources to performance of specific, mission-essential tasks. This will optimize HR cost and identify excess HR funding. Efforts he described in this area include INWF's identification of mission tasks and requirements and efforts optimizing distribution.

Mr. Hall also said that Sea Warrior will improve quality of service by decentralizing, flattening, and adding transparency to processes and allowing users maximum control and understanding of events that affect their performance. He believes that this will improve customer satisfaction and reduce infrastructure costs.

In the manpower area, Sea Warrior will state and fulfill manpower requirements using industry-standard, cross-functional, legally defensible taxonomies. Doing so, Mr. Hall believes, will identify and eliminate redundancies in stovepiped HR requirements and solutions, enhance workforce portability, and reduce human capital costs. Efforts described in this area include studies using the SkillsNET methodology and the development of the NEC/Skill Object crosswalk.

Finally, Mr. Hall noted that Sea Warrior will improve current and future readiness by indexing HR readiness to specific mission tasks. This will allow the Navy to reinvest HR savings in recapitalization for

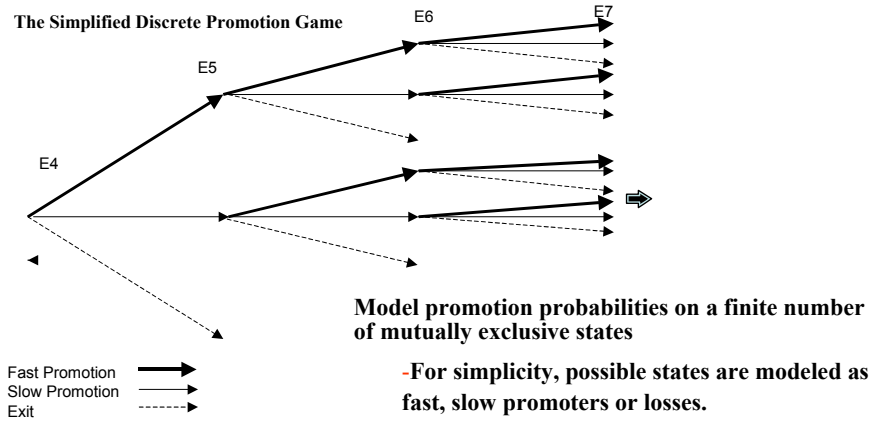
future capabilities and integrate future HR requirements into current HR planning. He mentioned several efforts in this area, including the development of integrated databases and synchronized updates, decision support tools, and increased Human Systems Integration.

Dr. Tanja F. Blackstone (ONR) and Mr. Tony Cunningham (NPRST) discussed Career Case Manager Technologies (CCMT), one of the prime enablers of Sea Warrior [38].

CCMT provides enlisted personnel with career information on promotion probabilities. The researchers noted that the payoffs include more accurate probability predictions based on analysis of historical data, increased customer satisfaction, enhanced career planning, and reduced uncertainty about choice.

In FY03, the researchers developed a theoretical statistical model and specified an interface for CCMT (see figure 29). They also developed four datasets for the Nuclear and Administration Communities. In FY04, they will estimate and validate the statistical model for specified skill groups and will estimate associated probabilities. They also will create datasets for an additional three to ten skill groups.

Figure 29. CCMT model[a]



a. Source: Mr. Tony Cunningham and Dr. Tanja F. Blackstone, "Career Case Manager Technologies," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [38].

An important part of collecting information and knowledge is translating it into something that can be used to guide thinking and decision-making. Several presentations described current efforts to develop manpower metrics for this purpose.

CDR Shannon Kawane (OPNAV) discussed the development of performance measures, tools, and predictive models for Navy personnel management [39].

CDR Kawane noted that current measures and processes used for personnel management need to be improved. Most traditional N-13 processes, he contended, were not uniform—community managers gathered and analyzed metrics for their respective communities to arrive at community management decisions. He believes that these methods do not provide predictive analysis to allow effective anticipatory decision-making. He also said that current data reside on numerous NMCI and legacy systems, making them not readily accessible to decision-makers.

The primary goal of this effort is to provide a standard set of metrics and tools that community managers, compensation policy analysts, strength and promotion planners, and senior leaders can use to make informed decisions. This standard set of metrics and tools will allow consolidation of data and IT systems. Figure 30 describes the current status of N-13's effort to develop metrics. Predictive modeling tools also will be developed to allow staff to anticipate changes—improving the organization's performance in meeting CNP objectives and maintaining Fleet readiness.

CDR Kawane believes that incorporating these efforts into N-1's Balanced Scorecard (BSC) initiative will focus the organization on the most important processes and ensure that the organization's members clearly understand how their efforts contribute to the mission.

Ms. Martha Maddux (Program Manager for NPDC's Dashboard) described the Navy's effort to develop and monitor performance metrics [40]. Like a car's dashboard, Enterprise Performance Management (EPM) Dashboards allow users to monitor key performance indicators (KPIs). They also give executives timely insights into performance issues and allow them to share insights across the enterprise.

Figure 30. Preliminary results in performance measure development[a]

- 20 performance measures identified to date
  - All tied to the supply chain model
  - All linked to the CNP Strategy Map
  - 4 provide policy ROI
  - 5 provide feedback on effect of policies on supply chain process
- 5 processes remain for performance measure development.

a. Source: CDR Shannon Kawane, "Developing Performance Measures, Tools and Predictive Models for Personnel Management," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [39].

Ms. Maddux said that dashboards provide the current status of a particular concern or project online, are automatically updated, disseminate the same information across the enterprise, and can be tailored for executives. She cautioned, however, that an effective EPM Dashboard should target an initiative or a plan—only reporting data that affect the KPIs. When effectively developed, she added, dashboards can provide increased stakeholder satisfaction, better budgeting, better agency performance, reduced staff hours, and more learning and growth.

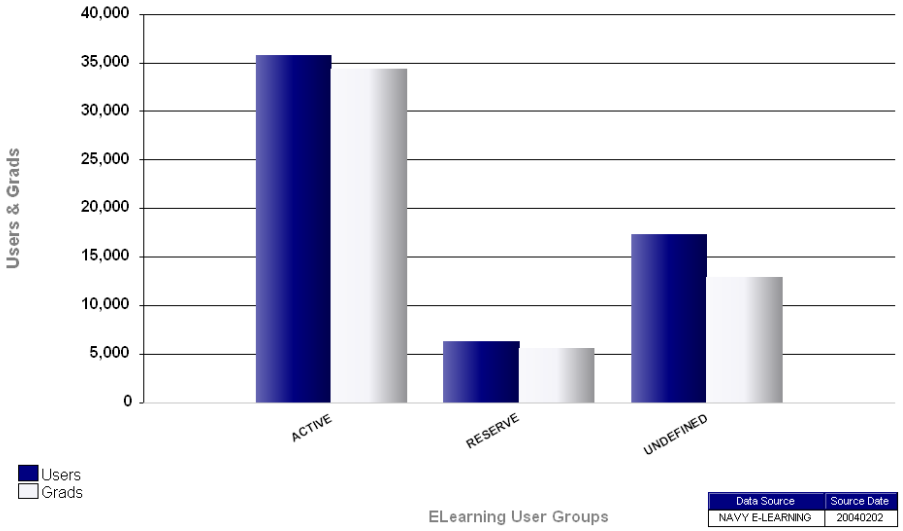
The goal of the EPM Dashboard effort is to incorporate usable data into the Navy's Data Warehouse. Dashboards will eventually become part of N-1's BSC system, including measures on customer perspective, process perspective, strategic objectives, financial perspective, and the Sailor's perspective, and will change as new data sources and capabilities become available.

Ms. Maddux concluded by presenting metrics currently in the EPM Dashboard. Figure 31 provides an example of one such a metric.

CAPT William Wilcox (OPNAV N12B) presented N1's Balanced Scorecard (BSC) initiative, which has been named the Navy Manpower and Personnel Strategy (N-MAPS) [41]. BSC is a tool that corporations, non-profits, and government use for strategic

management and measurement and includes a strategy map containing four perspectives: customer, financial, internal processes, and learning and growth. These perspectives provide a balanced look at an organization rather than the historical focus on only the financial aspect. Each of these four perspectives contains N1 strategic objectives. Metrics measure each objective (ideally one lead and one lag metric for each objective). See figure 32 for an example.

Figure 31. Number of E-learning users and graduates[a]



a. Source: Ms. Martha Maddux, "NETC Enterprise Dashboards: Background and Samples," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [40].

The metrics identified for each strategic objective will be used to provide a dashboard for the CNP to measure the current health and success of his organization. Each of his business units in Washington and in Millington are developing cascaded strategy maps of their own with objectives and metrics that support the larger N1 strategy map. Once the software installation and data warehouse population are complete, N1 will notice immediately when metrics for a particular strategic objective turn downward and will be able to drill down using the cascaded metrics to identify the underlying problem.

Figure 32. N-MAPS customer metrics[a]

			Tolerances			
Metric	**Lead / Lag**	**Freq**	**Green**	**Yellow**	**Red**	**Data Source(s)**
STRIKE GRP OFF READINESS	Lag	M	≥ 95%	90-94.9%	<90%	Officer Master File
SHORE FIT SHORE FILL CONTROL GRADE	Lag	M	≥ 85% ≥ 95%	75-84.9% 90-94.9%	<75% <90%	Officer Master File
STRIKE GRP ENLISTED READINESS	Lag	M	≥95%	90-94.9%	<90%	Enlisted Master File
ENLISTED FLEET BALANCE	Lag	M	95-100%	90-94.9% 100.1-105%	<90% >105%	EPMAC Data Warehouse

a. Source: CAPT William Wilcox, "Navy Manpower and Personnel Strategy (N-MAPS)," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [41].

N-MAPS is still a work in progress, as metrics and cascaded strategy maps are still being refined. Next steps include mapping data sources to the data warehouse, writing the business rules for the N-MAPS (BSC) software, and operationalizing N1's dashboard. Despite the remaining work to be done, N-MAPS currently is the format used for discusssions and decisions made at all of N1's senior leadership meetings and offsites.

Metrics also are being developed to help Navy classifiers, their managers, and others interested in improving the classification system. Dr. Gerald Cox (CNA) reported on the first phase of a study in which he explored the classification process and proposed several classification metrics [42].

Based on observations of classification sessions at several different Military Entrance Processing Stations over the course of a year, Dr. Cox found that—in most instances—classifiers exert greater influence over candidate recruits' enlistment choices than do enlistment bonuses (on which the Navy currently spends $85 million annually). He questioned whether classifiers receive adequate direction for prioritizing various objectives (see figure 33) and making tradeoffs among conflicting goals.

Figure 33. Classifiers' objectives[a]

Classifiers' objectives

- Closing a contract
- Filling critical ratings
- Matching abilities and ratings
- Maintaining "DEP slope"
- Managing diversity
- Informing recruits of options
- Producing satisfied Sailors
  - Limiting attrition

Many of these may be in conflict

a. Source: Dr. Gerald Cox, "Classifiers in the Accession Process: A Poorly Understood and Undervalued Asset," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 29, 2004 [42].

To help gauge classifier performance, Dr. Cox proposed a variety of metrics, including ones for the proportion of candidates who enlist, the proportion of candidates who sign to critical ratings, maintaining an appropriate balance in ship dates, matching the abilities of candidates with ratings requirements, managing diversity, and a range of other classifier objectives. Over the next few months, he will begin estimating values for these metrics. He also will perform regression analyses to examine such issues as whether classifier characteristics affect accession or whether there are tradeoffs among classifier objectives.

The collection and use of individual-task data have been sporadic over the years. With the Defense Readiness Reporting System's emphasis on readiness, Sea Warrior's implementation, and FORCEnet's identification as the "operational construct and architectural framework for Naval Warfare in the information age," these data have become increasingly important.

Ms. Dee Quashnock (SPAWAR 055) described FORCEnet's HSI/MPT strategy, which centers on individual-level task data [43]. The effort's goals are to collect C4ISR individual-level task data to support product

development, implement a "re-use" strategy for efficiency, and support C4ISR departments and divisions being stood up in the Fleet.

Ms. Quashnock noted that individual-level task data can be used for a variety of purposes, including system and training design, user documentation, manpower analysis, human-computer interface design, test and evaluation, and performance and program assessment. By providing a common operational framework, individual-level task databases can facilitate the re-use of task information for multiple purposes—thus reducing development costs. In addition, these databases enable multi-modal learning and application since officers and Sailors can see how information learned in one environment can be transferred or applied to activities in another environment.

Dr. Jacqueline Mottern (NPRST) described a data collection effort, called 1st Watch, which is designed to help the Navy better understand the transformation of civilians into Sailors over the first enlistment term [44]. The comprehensive questionnaires use a longitudinal design to monitor the first enlistment term for a one-year cohort of 50,000 recruits (see figure 34).

Figure 34. 1st Watch questionnaires and their common components[a]

New Sailor Survey	RTC Graduate Survey	A/Apprentice Graduate	Exit During Training Survey
Influence to Join Navy	**RTC Command Climate**	**SSC Command Climate**	**RTC/SSC Command Climate**
Recruiting and DEP	**Recruiting and DEP**	**Training Evaluation**	**Recruiting and DEP**
Classification	**Classification & Re-class**	**Satisfaction with Rating**	**Classification**
P-E Fit	***P-E Fit***	***P-E Fit***	***P-E Fit***
Stress Adaptability Scale	**Training Experiences**	**Training Experiences**	**Training Experiences**
Social Support	**Problems During Training**	**Problems During Training**	**Problems During Training**
Cognitive Appraisals	***Navy Commitment Scale***	***Navy Commitment Scale***	**Reasons to Leave**
Personality Measures			

a. Source: Dr. Jacqueline Mottern, "1st Watch on the First Term of Enlistment," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [44].

Questionnaires will allow the Navy to link attrition and performance to a variety of unique measures, including levels of person/organization fit, commitment, stress coping skills, perceived social support, expectations of the Navy, and training experiences. Measures also will help to identify those who might benefit from an early intervention, with the hope of reducing unwanted attrition, increasing reenlistment, and reducing first-term costs.

Dr. Mottern reported that preliminary New Sailor Survey results show that self-efficacy, hope, and cognitive appraisals are highly correlated. Negative cognitive appraisals, fear of failure, and stress also are correlated. Furthermore, the survey shows differences between RTC graduates and nongraduates. For example, RTC graduates have lower stress, higher morale, and higher coping adaptability. Dr. Mottern pointed out that the P-E fit is the best commitment predictor.

Dr. Mottern noted that a web-based questionnaire coordinated with the NPDC was completed in May, and data collection will continue at Great Lakes through FY04. Several surveys also are being revised.

Efforts to collect and disseminate information and knowledge include disseminating Navy training through the use of new technologies. Game-based training meets the Navy's training requirements: it is reusable, shareable, dependable, distributable, and reliable.

Mr. Perry McDowell (MOVES Institute, NPS) discussed how games can be used as training tools [45]. He emphasized that people in their late teens and early twenties (who make up a large share of the Navy) have grown up in a world of personal computers and video games. In fact, researchers estimate that today's 18-year-olds have spent 10,000 hours playing video games and 250,000 hours writing e-mails—making them less willing than previous generations to tolerate training methods that do not actively engage them.

Mr. McDowell discussed the Marine Corps' use of a modern first-person shooter game as a training aid for squads, as well as several other games (such as Bottom Gun, Joint Forces Employment, and Full Spectrum Command/Warrior) that the military has developed for training. He also pointed out the effectiveness of "America's

Army" as a recruiting tool as an example of how games resonate with the military's prime demographic.

During the presentation, an audience member suggested that women may not be as interested as men in video games. Mr. McDowell acknowledged that this question must be studied in the future.

As Mr. P. Stanley Peters (Stanford University) noted, establishing and maintaining proficiency in damage control (DC) and firefighting is one of the most difficult challenges facing a Navy ship's crew [46]. In fact, the Navy has long recognized the need to train Damage Control Assistants (DCAs) under realistic, stressful circumstances.

Mr. Peters described his and his colleagues' work on developing, testing, and evaluating a "smart" computer-based DC trainer, DC Train plus SCoT DC. DC Train provides DCAs with an intensive, realistic experience of coordinating ship DC in a large number and wide range of scenarios involving fire, smoke, and flooding. He noted that a recent evaluation found that it successfully approximated DC's stressful environment.

SCoT DC provides individual and team training using a "mentor/student" relationship, in which a computer instructor critiques a trainee's performance. It was developed in a OSD-funded and ONR-managed basic research MURI project, with the aim of advancing the state of the art for sophisticated training systems. SCoT DC uses natural language understanding and generation with speech recognition and synthesis technology to allow the computer to give a student direct, personalized verbal feedback, and evaluate a student's actions during training. Figure 35 illustrates the type of feedback generated.

Mr. Peters reported that DC Train is now stable, with several dozen DC exercises (developed by former Navy DCAs) now available and spoken commands enabled. He said that while DC Train could be used "as is" for some training, it should be rebuilt, based on lessons learned, with capability to simulate many ships for more general training.

In the future, the Navy will use intelligent software agents and auctions to revolutionize the way people are matched to jobs. Mr. James

Simien (NPRST) described Web-based Marketplace, a project to develop a computing infrastructure to support intelligent software agents and auction technology for the Navy [47]. He also demonstrated the intelligent agent tool.

Figure 35. Excerpt of SCoT DC feedback[a]

- System: The first crisis was a fire here in Crew Living space No. 1.
  [display centers on the compartment]
- System: This fire was not contained early enough. As a result, the fire spread to the adjacent Combat system equipment room No. 2.
  [highlights 2nd compartment]
- System: OK, let's review how to handle this crisis.
  [removes highlight from 2nd compartment]
- System: What's the first thing you should do when the fire alarm sounds?
- Student: Send repair two to investigate.
- System: Yes, that's right. However, you failed to do this during the session. This is a mistake you made more than once. Remember, alarms need to be verified first.
- System: OK, suppose that there is a fire. What's the next step?
- Student: Set fire and smoke boundaries.
- System: Yes.That's what you did during the session.

a. Source: Mr. Stanley Peters, "Intelligent Voice Interactive Systems for Damage Control Training," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [46].

The developers of the Web-based Marketplace set out to create a Multi-Agent System incorporating software agents and to provide a marketplace where Sailors could be matched to jobs, while ensuring that distributed processes would not increase workload for individual Commands and Sailors. Figure 36 shows the direction of the effort's focus in FY04.

Mr. Simien hopes that intelligent agents will allow the Navy to take advantage of present computing architectures and to adapt to future technological advances.

Mr. Ed Harvey (BMH) described the design and development of a selective fidelity team training simulation device for ASW aircraft

[48]. The Mission Rehearsal Tactical Team Trainer (MRT3) is part of ONR's Virtual At-Sea Training (VAST) family of combat trainers.

Figure 36. Major focus of FY04 Web-based Marketplace efforts[a]

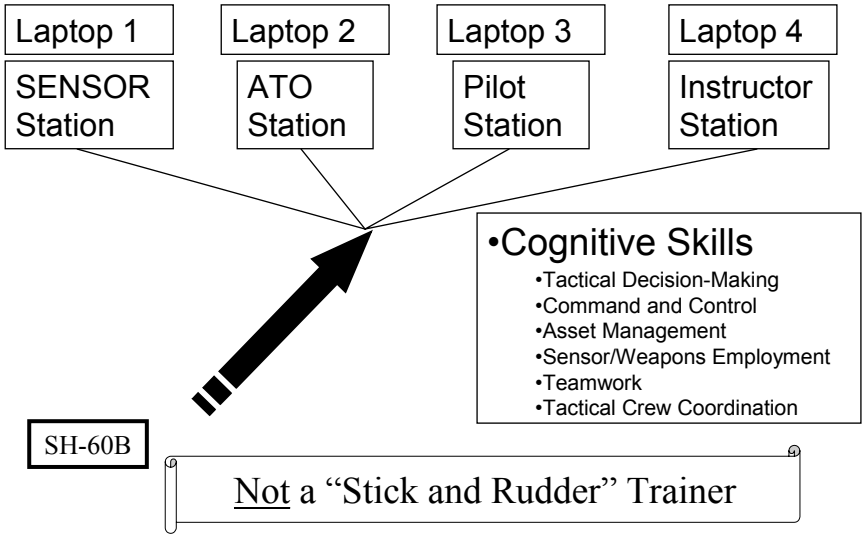
- **Investigation into parallel multi-agent computation**
- **Develop agents to assist Sailors in communicating complex preferences in the WBM**
- **Develop proactive agent to assist Commands in filling impending job vacancies with qualified Sailors**
- **Develop proactive agent to incorporate training schedules, costs, and identification of training gaps**
- **Develop Counselor Agent to recommend jobs best for individual Sailor career growth**

a. Source: Mr. James Simien, "Software Agents in Distributed Architectures," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [47].

The current MRT3 system configuration has networked crew stations for the instructor and the pilot, air tactics officer, and the sensor operator of the SH60-B helicopter. Training is delivered via four Pentium laptops over a local area network (see figure 37).

Mr. Harvey discussed the use of low physical fidelity training devices to provide mission training in complex warfighting tasks. He observed that, unlike traditional physical fidelity training devices, MRT3 provides very high mission space fidelity because it includes other "team" members, a wide range of adversaries, no range limitations, no safety concerns, and no limits on weapon employment. He noted that MRT3 also provides a previously unavailable capability for SH-60B aircrew to maintain their training qualifications while deployed.

Figure 37. MRT3 phase one system configuration[a]



a. Source: Mr. Ed Harvey, "Application of Selected Fidelity Simulation Development Techniques to Address Advanced Fleet Anti-Submarine Warfare (ASW) Team Training," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [48].

Several presenters noted, however, that distributing information and knowledge through game-based training technologies requires open-source solutions.

Mr. Michael Cleveland (NETC) discussed some of the problems associated with building games under current business models [49]. He noted that developed training software is generally proprietary. This means that the government must use the same company for any follow-on work. Open-source solutions are more flexible—allowing any vendor to repurpose previously developed systems for another training system.

He said that many government entities, such as NASA and the Defense Information System Agency, are moving toward using open-source solutions, and NETC has followed their lead. Mr. Cleveland believes doing so will encourage cheaper, better, and faster software evolutions and more reusable game-based training programs.

Mr. McDowell described a case illustrating the need for an open-source game engine [50]. The MOVES Institute licensed a commercial game engine, which generally costs $300,000 to $1 million, to develop the "America's Army" video game. But once the game was developed, the game engine could not be used for another game without paying another licensing fee. Since the Navy needs hundreds of training simulations, this fee makes the cost of commercial game engines prohibitive in building training applications.

To avoid this cost, MOVES is producing P-51—an open source game engine designed for a wide range of applications. P-51 allows easy replacement of modules as improved technology is developed, which allows it to maintain a "best of breed" approach. Figure 38 shows the development strategy. This new engine will be demonstrated at the Interservice/Industry Training, Simulation and Education Conference this December.

Figure 38. P-51 development strategy[a]

- Commoditize gaming engines and console hardware using open source and standards
- Leverage first-mover advantage to standardize content creation and applications
  - Order of magnitude speed-up in development time
  - Order of magnitude decrease in development costs
    - Pay non-recurring development costs ONCE
    - Pay recurring costs via maintenance model (e.g. Redhat)
- Motivate tool makers to participate
- Motivate prime contractors to adopt
- Motivate programs to endorse
- Motivate OSS community to contribute

a. Source: Mr. Perry McDowell, "P-51: An Open Source Game Engine for Military Use," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [50].

Mr. Charles McLean (NIST) further discussed the Navy's need for game engine technology to develop and deliver simulation-based training to Sailors [51].

He noted that game engine technology would support traditional course management systems as well as game and simulator functions. It also should be able to interface with legacy learning systems, run on the Navy's personal computers, and support security policies and access mechanisms.

Mr. McLean has developed a criterion that can be used to evaluate game engines and their ability to produce effective training systems for the Navy (see figure 39).

Figure 39. Game engine comparison criteria[a]

- ***Graphics and sound***
- ***Game engine management***
- ***Character animation***
- ***Physics***
- ***Artificial intelligence***
- ***Game editor and development tools***
- ***Application data import and export***
- ***Multi-player operations and server support***
- ***Software distribution and security mechanisms***
- ***Learning system support***

a. Source: Mr. Charles McLean, "Comparison of Available Gaming Technologies," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [51].

Decision-making

Good decision-making requires knowledge: knowledge about current and future conditions, external factors, policies, costs, and benefits. Researchers presented several tools developed to help decision-makers and managers explore alternatives and, ultimately, make better decisions.

Mr. Paul Hogan and Dr. Pat Mackin (SAG Corporation) described the methods underlying their decision-making tool, the recruiting cost function (RCF), and demonstrated the tool's capabilities [52].

RCF is an optimization model that is derived from a recruit supply model. Given the state of external factors affecting recruiting (e.g., the unemployment rate, youth population, or relative pay) the model estimates the most efficient mix of recruiting resources to obtain a specified quality mix of recruits. Alternatively, the model can calculate the largest recruiting mission that can be achieved, given the budget and mix of recruiting resources and quality mix desired. The researchers included several resources in the analysis, including recruiters, education benefits, enlistment bonuses, and advertising.

The researchers have developed separate models for each of the four Services, and separate recruit production functions are defined for three recruit quality groups (high, medium, and low quality). The models (which the Office of the Under Secretary of Defense (Personnel and Readiness) Director of Accession Policy now uses) help estimate required resources to achieve a program and provides a quick test of a given program's feasibility. Mr. Hogan and Dr. Mackin noted that the model can run with exact or inequality constraints on the use of various resources—a lower bound for advertising expenditures, for example, and a minimum number of recruiters. Figure 40 shows several of the model's resource options.

Figure 40. Recruiting Cost Function (RCF) model features: Additional resource options[a]

- Includes educational benefits and accession bonuses in low and medium quality recruit production functions
- Adjusts results for impact of changes in recruiter support budget
- Spreads model year and residual Enlistment Bonus spending across years in which obligation will be paid
  - Based on user input
- Accounts for changing value of Montgomery GI Bill benefits
  - Increase in real value of the GI Bill will result in increased high quality accessions

a. Source: Mr. Paul Hogan and Dr. Pat Mackin, "Recruiting Cost Function: A Model to Improve Recruiting Resource Planning," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [52].

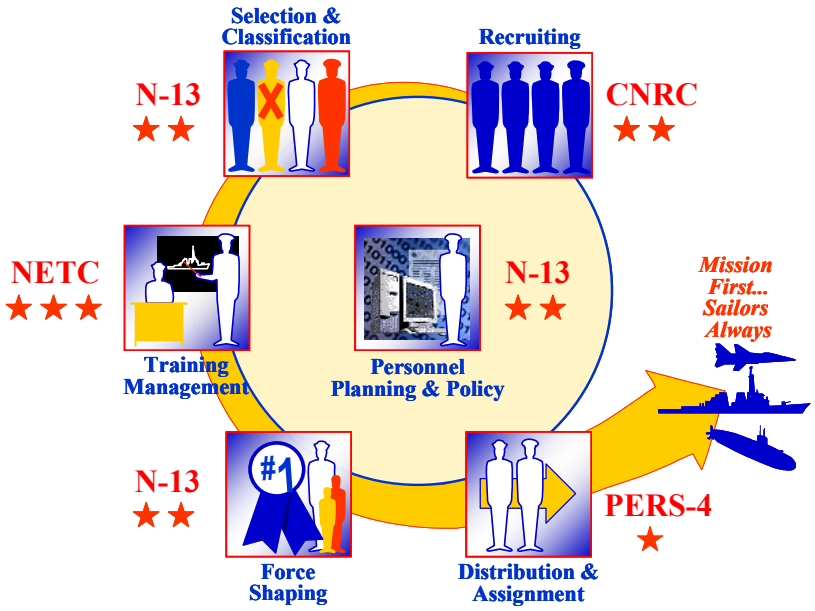
Recently, the model has been modified to provide stochastic estimates of output rather than a point estimate of the minimum cost budget. For example, it provides a distribution based on simulation methods. The stochastic elements are directly related to the standard errors of the model's parameters and the overall regression error from the supply models.

Mr. David Cashbaugh (NPRST) described another tool being developed that will facilitate optimization, forecasting, and simulation routines—allowing decision-makers to ascertain the net benefits and net costs of various policy alternatives [53]. In fact, the payoffs to improving the recruiting, training, and detailing process can be substantial. He estimates that just a 1-percent improvement would save the Navy $34 million.

The COMPASS prototype is a multi-function, multi-organizational decision support system that will facilitate adaptation and proactive responses to endogenous and exogenous factors. Mr. Cashbaugh noted that the tool models the process of recruiting, training, and detailing Navy Sailors as a supply-chain management model—one in

which a different Navy component is responsible for each link in the chain (see figure 41). Although each component has tools with which to manage its own area of responsibility, there previously was not a tool to model the entire process. COMPASS was designed to be an "early warning" system that also facilitates "what if" scenarios, forms metrics, and gives users a better understanding of the entire "Street-to-Fleet" process. Mr. Cashbaugh hopes the tool will stimulate interaction between the various Navy components involved in the process, will allow better adaptation to unusual situation and events, and will help to identify emergent behaviors.

Figure 41. Organization of the Navy manpower and personnel supply process[a]

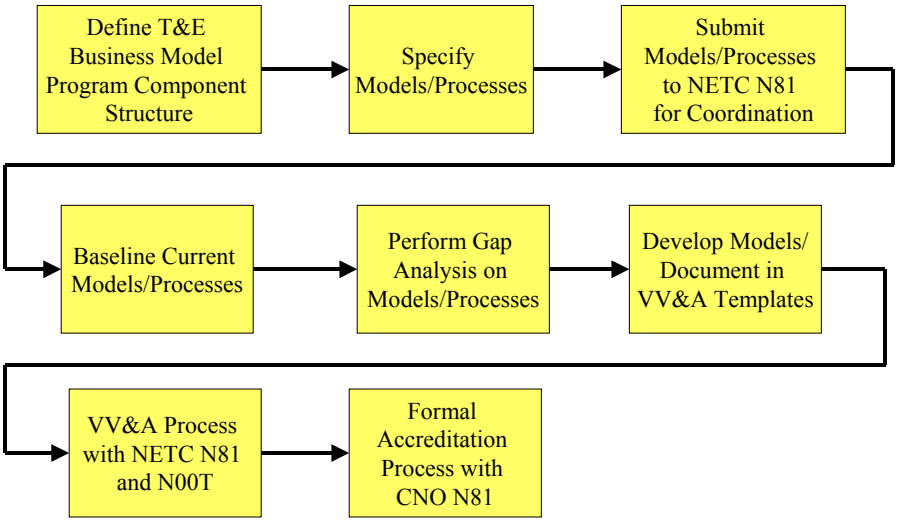


a. Source: Mr. David Cashbaugh, "Comprehensive Optimal Manpower Personnel Analysis Support System (COMPASS)," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [53].

Ms. Sarah Aust (NETC N81) described the process for developing, documenting, verifying, validating, and accrediting training and education performance models and cost-based capability models [54].

She noted that these models are generally composed of three pieces: requirements (how many and what type?), production (what is needed to produce requirements?), and pricing (how to value inputs, processes, and outputs). Figure 42 describes the performance model development process.

Figure 42. Performance model process[a]



a. Source: Ms. Sarah Aust, "Developing Training and Education Performance Models and Cost-Based Capability Models," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [54].

Ms. Aust noted that NETC Flight Training performance models have been developed and are undergoing formal Validation, Verification, and Accreditation (VV&A). The NETC Enlisted Accessions program is currently developing and documenting its performance models. These two models will provide a large breadth of information, including organizational interdependencies (the NETC accessions production model is fed by PERS N13's requirements model), when ROI merits developing new models vice documenting current models, and information for resource decisions over the FY.

At any given time, thousands of Sailors are looking for their next assignment. The "assignment problem" is to minimize costs while filling the most jobs, such that Sailors rotate between sea and shore duty.

Dr. Mark Lewis (University of Mississippi) described a software tool he has developed to assist with an expanded version of this problem [55]. He expands the simple assignment model to include training classes, job categories, and ships. He models these additional elements using interval bounding variables—i.e., requirements are met at either a 0 level or a positive interval. For example, a training class will not "make" with only one student; a job category requires at least five Sailors as part of a team.

Dr. Lewis's tool uses a mixed-integer binary program preprocessing and search technique, called Guided Design Search (GDS), which generates unbiased samples of the solution space. It calculates each variable's estimated effects on the objective function, which can be used to guide a search algorithm and can be analyzed as part of a simulation-optimization method. Since GDS calculates the average effects of a decision variable, it can be used to help answer questions, such as, Which has a bigger effect on the objective function's costs—filling ship #1 or ship #2 with its requisite number of Sailors? Dr. Lewis found that GDS is able to produce better answers in less time than standard techniques (see figure 43).

Figure 43. Guided Design Search (GDS) optimization test results[a]

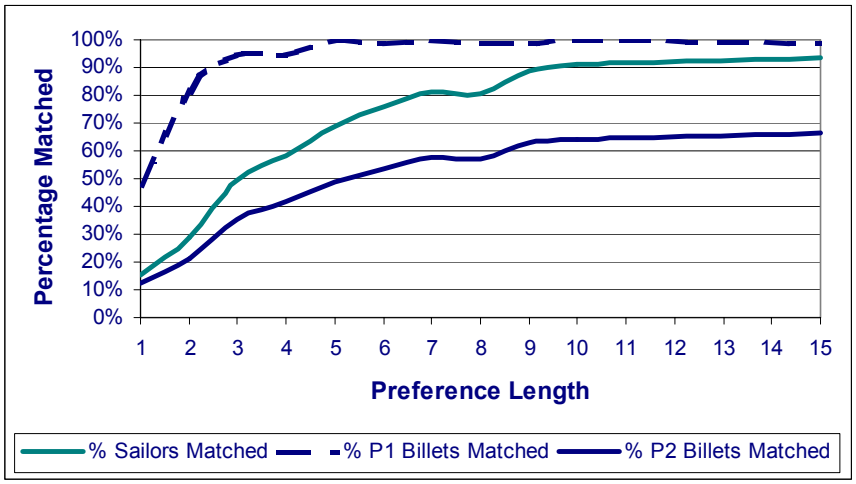
- Example data: **350 Sailors** assigned to **500 possible jobs** on **20 ships** awaiting possible deployment
  - The training classes have various characteristics
    - e.g. # of classes, size of classes, # jobs training qualifies
  - There are various costs for: shore duty, leaving Sailor with current assignment, change-of-station, ship deployment, etc.
- For problems *solved to optimality*
  - GDS was **~10x faster** than CPLEX (the industry standard solver)
- For larger problems (*unsolvable to optimality* due to time & memory limitations)
  - GDS found **lower cost answers** than CPLEX

a. Source: Dr. Mark Lewis, "Guided Design Search for the Sailor Assignment Problem," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [55].

CDR Bill Hatch (NPS) and Dr. Bill Gates (NPS) examined whether the introduction of AIP increased the performance of the Navy's enlisted personnel assignment process in a simulation environment [56]. They also studied what would be the most effective AIP implementation strategy.

For their analysis, the researchers used a previously developed simulation tool, including the Deferred Acceptance (DA) and the Linear Programming (LP) matching algorithm, to simulate the assignment process. Their sensitivity analysis suggested that the Navy should mainly emphasize Sailor quality rather than saving AIP funds to maximize utility (including pecuniary benefits) and the number of stable possible matches. They also found that doubling the length of the preference list (Sailors' preferences for billets and the Navy's preferences for Sailors) cuts unstable matches significantly in the "Quality" scenario and increases the average percentage of matches (see figure 44).

Figure 44. Effect on matches of increasing the preference list length[a]



a. Source: CDR Bill Hatch and Dr. Bill Gates, "Simulating Assignment Incentive Pay for Enlisted U.S. Sailors," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [56].

CDR Hatch and Dr. Gates noted that future research should simulate AIP business rules that model observed bidding behavior, analyze alternative optimization algorithms, and focus on developing a detailer decision support system.

Dr. Wesley Nimon (NPRST) described a tool that can be used to determine which assignment auction format would be most efficient for distributing special pays, such as the Navy's AIP [57]. He presented initial results of an experimental study that is one part of a broader distribution incentive project.

The auction engine developed and tested combines the power of optimization and the efficiency of auctions. Dr. Nimon presented economic analysis that uses this software to conduct laboratory experiments—allowing him to address a variety of issues, such as the optimal weight to apply to the Sailor's bid, the most efficient auction format, and the degree to which the contention level matters. Figure 45 shows the basic structure of these auction experiments. Dr. Nimon also showed screen shots that both the research subjects and the researcher viewed in these experiments.

Figure 45. Basic structure of the auction experiments[a]

- **Subjects are presented with list of jobs**
- **Total Score = Fitness Score + Bid Score**
- **For each job their Reservation Wage (RW) is given**
- **For the awarded job the subject receives Points = Bid-RW**
- **Subjects exchange their points for US dollars at a pre-announced exchange rate**

a. Source: Dr. R. Wesley Nimon, "NPRST Auction Research in Support of Sea Warrior CMS," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [57].

Dr. Nimon noted that the goal is to design auction rules that minimize the amount over a Sailor's true valuation (i.e., his reservation wage) that he bids and the Navy pays. If this is not accomplished, the

Navy ends up paying inefficient economic rent—money that could have been used to entice another Sailor to volunteer for a hard-to-fill billet. He hopes this research will detect the auction design that most discourages strategic bidding—that is, bidding more than one's reservation wage.

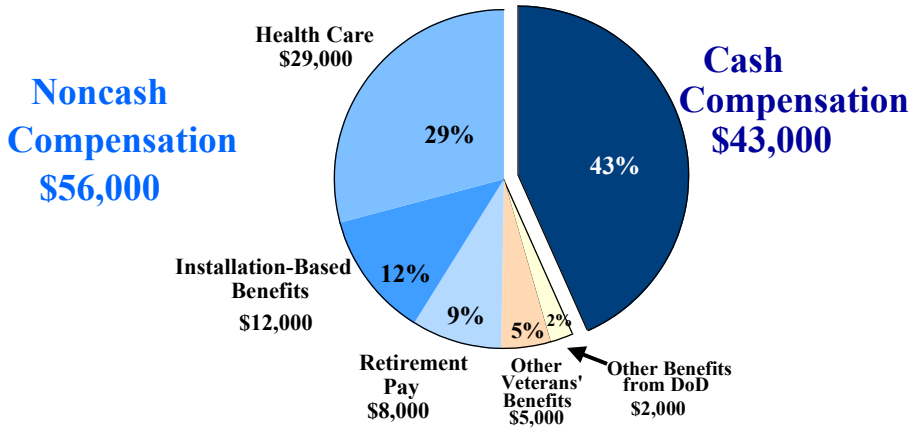
The results of Dr. Nimon's work will inform the auction design decisions and development of AIP in the Sea Warrior Career Management System (CMS).

Rewards

To attract and retain military personnel, the Department of Defense must offer a compensation package that is competitive with the civilian sector and adequately rewards Servicemembers for the rigors of military life. Dr. Carla Tighe Murray (Congressional Budget Office) provided an overview of the military compensation package and presented arguments for and against the current mix of cash and noncash compensation [58].

She estimates that, in 2002, the average active-duty Servicemember received a compensation package worth approximately $99,000 (see figure 46).

Figure 46. Average active-duty compensation, FY02[a,b]



Source: CBO based on data from DoD and OMB

a. Source: Dr. Carla Tighe Murray, "Military Compensation: Balancing Cash and Noncash Benefits," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [58].
b. Deferred compensation estimated on an accrual basis.

Noncash compensation accounts for 57 percent of this cost. This is a higher share than in the private sector (24 to 27 percent for workers under 35) and elsewhere in the federal government (26 to 32 percent for federal nonmilitary civilians under 35).

Immediate cash compensation—basic pay, allowances for such things as food and housing, special pays and bonuses, and tax advantage (some allowances are not subject to federal income tax)—accounts for the other 43 percent. About 39 percent of noncash compensation includes subsidized goods and services that Servicemembers can consume immediately, such as medical care, groceries, housing, and child care. The remaining 61 percent of noncash compensation is deferred—the accrued cost of benefits that a member only can use after leaving active duty, such as military retirement pay, health care for retirees, and veterans' benefits.

Some recent policy initiatives, including eliminating the retirement pay offset when disability compensation is received and expanding health care coverage for reservists, have shifted the overall mix of compensation further toward noncash and deferred benefits. Some favor noncash benefits, asserting that noncash benefits promote readiness and attract and retain Servicemembers at lower cost than cash. They also claim that noncash benefits ensure good quality of life (particularly for young Servicemembers) and provide a stable form of compensation. Those who favor cash compensation argue that its value is more easily recognized, it gives individuals more choices, and it creates a more effective compensation system.

As part of her study, Dr. Tighe Murray explored options to increase the share of cash compensation. These include offering a medical "cafeteria plan" allowing employees to choose between cash and noncash medical benefits, or offering cash allowances instead of noncash benefits. Proponents of these policy changes argue that they would increase flexibility and allow enlisted personnel to select the compensation package that best fits their needs. Some critics of the current system also propose incorporating noncash benefits into the military's personnel budget as a way to more clearly identify the entire compensation package and to encourage more efficient use of military personnel.

LT S. J. Looney (N130C1) described a proposal to replace Family Separation Allowance (FSA) and Imminent Danger Pay (IDP) with Hardship Duty Pay (HDP) [59]. She noted that such a move would more equitably compensate members, especially those deployed in operations like Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF), and would result in a pay that meets the five measures of effectiveness: adequacy, affordability, flexibility, equitability, and simplicity.

Forces deployed or assigned to combat zones currently receive several additional pays, including IDP, FSA, and HDP-L (see figure 47).

Figure 47. Compensating pays for various hardships[a,b,c,d,e,f,g]

	Factors the Pay Compensates					
Pay	**Arduousness**	**Danger**	**Excessive deployment**	**Family Sep.**	**QOL**	**Rate/mo**
FSA				X		$250 (Note c)
IDP		X				$225 (Note b)
HDP	**X**	**X**	**X**	**X**	**X**	**$50-150 (Note d)**
HDA			X			SUSPENDED
AIP	X				X	VARIES
SECDEF INVOL:	X		X			$1000 (Note e)
VOL:	X		X			VARIES (Note f)
JIP			X			$200 If approved (Note g)

a. Source: LT Stormi J. Looney, "Warrior Pay," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [59].
b. Temporarily increased from $150 to $225 – expires 31 Dec 04.
c. Temporarily increased from $100 to $250 – expires 31 Dec 04. Applies only to members with dependents.
d. Statutory max $300- FY05 Omnibus item to increase to $600. HDP can be paid under mission, location, and/or tempo.
e. Applies only to 12 Army units extended beyond 12 months. Expires 1 Jun 04.
f. Applies to members in Iraq/Afghanistan who extend beyond 12 months.
g. Still being vetted through OUSD(P&R) and Services for implementation. If approved, will be utilized under HDP authority.

Additionally, land-deployed personnel receive the incidental portion of per diem ($105 a month) and a subsistence allowance (BAS) ($254.46 a month). Ship-based personnel receive Career Sea Pay

(CSP), which can range between $50 and $700 a month, but averages about $350 a month.

The proposal would roll FSA and IDP into HDP and, according to LT Looney, would resolve perceived inequities between Servicemembers with and without dependents (those with dependents currently receive an additional $250 a month in FSA pay). LT Looney also noted that it would remove redundancies (HDP already includes some IDP and FSA components) by consolidating the three separate pays into one pay. Some audience members suggested that the new pay could be used to encourage volunteerism to hazardous areas and that payments could be market-based.

To make the new HDP effective, its statutory maximum would have to be increased (from $300 a month to $600 a month) to offset the IDP/FSA loss and compensate members for danger/family isolation aspects.

In recent years, some shore billets (e.g., in some undesirable U.S. and overseas locations) have experienced chronic manning problems. A new market-based pay for the Navy—Assignment Incentive Pay (AIP)—was implemented in June 2003 to address these problems. Mr. Tony Cunningham (NPRST) presented a brief AIP history and described his analysis of some of the data collected to date [60].

The Navy historically has relied on nonmonetary incentives to alleviate shore shortages, such as granting sea duty credit for undesirable shore billets. But such incentives constrain the distribution system and further exacerbate other manning shortages. Alternatively, the Navy uses a "share-the-pain" approach—with frequent moves between desirable and undesirable duty stations. This reliance on involuntary assignments to fill gaps ultimately lowers retention, Fleet readiness and productivity, and increases PCS and training costs.

The 2003 National Defense Authorization Act gave the Services authority to develop AIP. Mr. Cunningham noted that the necessary policy and business rules were developed over a 14-month period using an Integrated Process Team format. In addition, an AIP Management Board was established and resources were allocated to develop a tool to assist in managing the program.

The Navy implemented AIP (which is capped at $1,500) using an auction-like approach. Interested Sailors "bid" on an assignment (in $50 increments) in the Job Advertising and Selection System (JASS). At the end of a 2-week bidding cycle, the assignment authority reviews candidates and their bids. The qualified Sailor with the lowest bid is selected for the assignment, taking total costs (AIP, PCS, and retraining costs) into account. Detailers must document rationale if the lowest bidder is not selected. If no bids are received or the match quality is poor, the job can be relisted repeatedly until it hits its "must-fill" date.

Three AIP locations were initially selected:

- Naples, Italy
- Sigonella, Sicily
- Misawa, Japan.

Two of the locations (Naples and Sigonella) historically have been awarded sea duty credit as an assignment incentive, which AIP replaced. The third location (Misawa) previously had been awarded sea duty credit. Beginning in November 2003, Unit Identification Codes (UICs) in other locations were added in Guam, Sasebo, Yokosuka, Lemoore, and Italy.

Initially, maximum bid rates were established for each area. As bid data were analyzed, it became apparent that some ratings (distribution communities) required more of an incentive than others. To stimulate bid activity, rates have been selectively raised three times.

Mr. Cunningham noted that the results thus far have been encouraging. The number of AIP applications has been consistent with those of non-AIP locations, and bid activity has been wide-ranging—from zero to the Navy's maximum bid value (see figure 48). AIP also has resulted in a higher share of jobs being filled in some locations (see figure 49).

Dr. Diana Lien (CNA) explored several issues with using job and application statistics before and after AIP implementation to measure AIP's effectiveness [61]. She noted that several confounding factors, such as JASS use, the ratio of jobs to Sailors eligible to apply for a new job, and PCS costs, can affect these measures.

Figure 48. Overall AIP statistics (as of March 5, 2004)[a]

After 17 Requisition Cycles

	ALL JOBS		AIP JOBS	
Jobs Advertised	246575		7508	
Applications	84577	*34.3%* ↑	2920	*38.9%* ↑
Applicants	42906		2322	
Selections	20010	*23.7%* ↑	794	*27.2%* ↑

	Naples		Sigonella		Misawa		Guam		Lamad	
AIP Jobs	2684		2460		877		376		211	
Applications	897	*33.4%* ↑	1071	*43.5%* ↑	230	*26.2%* ↓	151	*40.2%* ↑	128	*60.7%* ↑
Applicants	772		836		218		111		95	
Selections	229	*25.5%* →	216	*20.2%* ↑	70	*30.4%* ↑	66	*43.7%* ↓	48	*37.5%* ↑

Total Involuntary Assignments: 32 (up from 25)

Lowest Bid: $0 **Highest Bid: $1200** **Average Bid: $285**
(Up from $281)

a. Source: Mr. Tony Cunningham, "Assignment Incentive Pay," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [60].

Figure 49. AIP statistics: Lemoore SSC 2[a]

Pre-AIP (23 Jun 2003 - 22 Jan 2004)		
	E4-6	**E7-9**
Jobs Advertised	2194	397
Jobs Filled	174	10
Percent Filled	8%	3%
Post-AIP (27 Jan 2004 - 6 Mar 2004)		
	E4-6	**E7-9**
Jobs Advertised	260	71
Applications	279	114
Jobs Filled	95	30
Percent Filled	37%	42%

a. Source: Mr. Tony Cunningham, "Assignment Incentive Pay," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [60].

Dr. Lien determined that JASS use differs significantly by demographic characteristics. After controlling for these characteristics, however, she found that there has not been a significant increase in JASS use since AIP implementation.

Because shortfalls in PCS funds may influence Sailors' job selections, information on PCS funds' effects on the selection process is important. Unfortunately, it currently is difficult to quantify impacts from PCS fund changes since reasons for nonselection are not uniformly coded. As such, Dr. Lien recommended establishing a consistent coding system of the selection process.

She recommended adopting a rule that automatically increases the AIP cap in certain situations (see figure 50). This would allow AIP to react to job priority and labor supply levels, prevent delays in voluntary job fills, simplify the cap increase decision process, allow bidding to reveal the true price of the job, and increase interest in AIP.

Figure 50. Suggested rule for automatic cap increases[a]

- Based on job type
  - Job type = jobs with the same community, paygrade, UIC, NEC1 and composite
- Cap implementation rules
  - Cap increases if none of the advertised jobs of a job type receive an application in the last three cycles
  - When a cap increase is implemented, <u>all</u> jobs of that specific type receive the increase
    - Includes all G, F, and B jobs of that job type

a. Source: Dr. Diana Lien, "Issues with the Assignment Incentive Pay System," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 29, 2004 [61].

Finally, Dr. Lien offered alternative AIP payment methods, showing that the value to a Sailor of making AIP payments lump sum (instead of monthly) is potentially greater than its cost to the Navy. She cautioned, however, that moving to lump-sum payments would require a mechanism to prevent reneging.

Rewarding Servicemembers is not only about compensating them adequately. An important component of Servicemembers' satisfaction is the degree to which they feel they are being offered good quality of life (QOL) while serving in the military.

For example, the quality of shipboard life is very important to Navy officers and Sailors. In fact, Dr. Gerry Wilcove (NPRST) found that satisfaction with shipboard life is more strongly associated with satisfaction with military life than *any other* QOL area [62]. He also found that many first-term enlisted and first-obligor officers reported that shipboard life decreased their desire to remain in the Navy. As such, improvements in shipboard habitability potentially represent the best opportunity for improving overall QOL and retention.

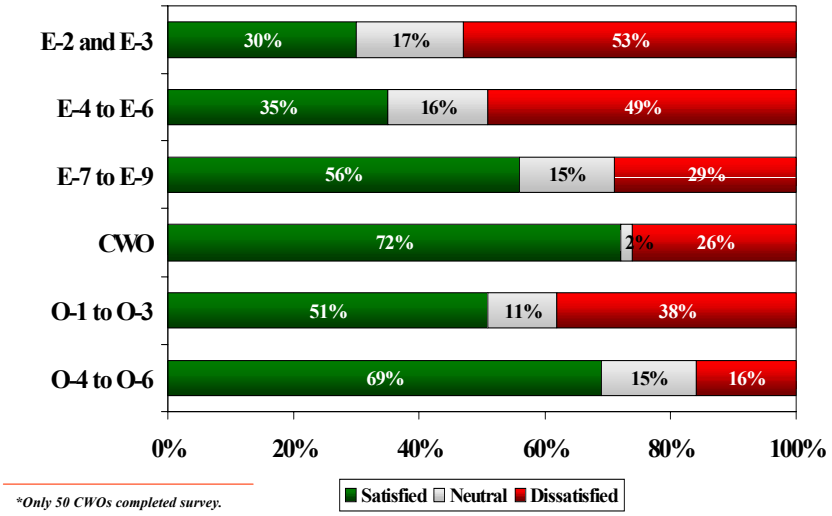
Dr. Wilcove analyzed the 2002 Navy Quality-of-Life Survey, containing 45 items specifically designed to assess satisfaction with shipboard conditions. The survey, which was administered to a stratified random Navy-wide sample, collected data between April and August of 2002. It gave Navy Officers and Sailors the option of completing it on paper or on the web. Responses were weighted by paygrade, race, gender, and Hispanic status to help ensure that results were representative of the Navy.

Dr. Wilcove summarized results on such topics as satisfaction with shipboard life, shipboard conditions, impact of shipboard life on desire to stay in the Navy, and relationship between shipboard conditions and ratings of overall military QOL. He found that, although a majority of senior enlisted and officers were satisfied with shipboard life, about half of junior and mid-grade enlisted (E-2 to E-6) were dissatisfied with shipboard life (see figure 51).

Based on his analysis of the reasons for this dissatisfaction, Dr. Wilcove recommended that improvements be made in existing conditions (e.g., mattresses, shower/head fixtures, and laundry). He noted

that other conditions will need to be addressed in designing the new generation of ships (e.g., room in the berthing area and noise levels). He also recommended that the Navy conduct periodic follow-up assessments and/or surveys to evaluate the impact of design changes on Shipboard QOL over time, and he suggested that the Navy construct a shipboard habitability decision support system to aid program managers.

Figure 51. Overall reactions to shipboard QOL by paygrade[a]



a. Source: Dr. Gerry Wilcove, "2002 Navy Quality-of-Life (QOL) Survey: Shipboard Life Results," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [62].

Dr. Jessica Janega (NPRST) and Dr. Kimberly Whittam (NPRST) examined Navy personnel's satisfaction with work life more broadly using results from the Navy-wide Personnel Survey (NPS) [63].

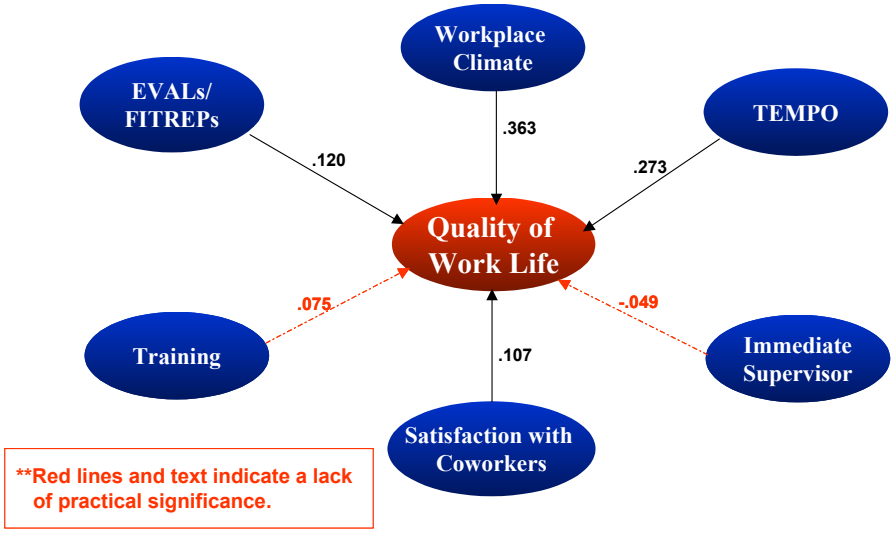
Quality of work life (QWL) was originally a movement to improve the effects of job experiences for individuals. It developed into a management approach in organizations to improve productivity, and, in recent years, has become a variable in itself measured through individual reactions to work and consequences of the work experience. The researchers stressed that QWL, which affects mission and combat

readiness, offers a potential solution to today's manpower and retention challenges.

The NPS, which was administered to the Fleet from December 2002 to May 2003, asked personnel about jobs, assignments, time away from home (TEMPO), leadership, career and career development, detailing, education, training, personal characteristics, financial status, and Navy life. It also included a global QWL measure.

Dr. Janega and Dr. Whittam examined QWL directly, as well as other related factors. QWL was measured using ten items in six domains: job satisfaction, long-term career plans, organizational commitment, satisfaction with position, work experiences compared to expectations, and overall satisfaction with Navy Life. They found that as satisfaction with workplace climate, TEMPO, performance evaluations, fitness reports, and co-workers increases, QWL increases. Workplace climate and TEMPO were the strongest factors predicting QWL (see figure 52). They also noted that workplace climate correlates with all the other predictive factors in the model and is key to improving QWL .

Figure 52. Factors predicting Quality of Work Life (QWL)[a]



a. Source: Dr. Jessica Janega and Dr. Kimberly Whittam, "Navy Quality of Work Life," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference,* March 30, 2004 [63].

The researchers cautioned that additional research is needed to confirm their exploratory model. They recommended that leadership continue to focus on QWL as a potential means of improving Navy efficiency and effectiveness and continue to make QWL a goal for increasing retention. They also suggested that future QWL studies continue to measure related factors for a more complete picture.

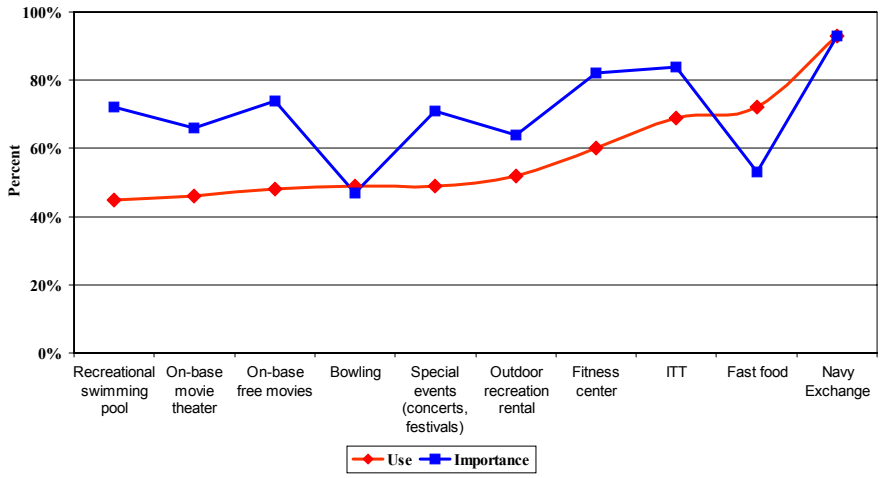
Servicemembers are heavily influenced by their spouses' perceptions of the military and the quality of military life (nearly half of all Navy officers and enlisted are married). Several conference participants presented data from surveys of military spouses.

Dr. Paul Rosenfeld (NPRST) and Ms. Zannette Uriell (NPRST) analyzed data from the 2002 Navy Morale, Welfare, and Recreation (MWR) Spouse Survey—a random sample of enlisted and officers' spouses [64]. The survey was designed to assess spouses' perceptions of MWR program importance, use, quality, and satisfaction; obtain spouses' views on MWR's contribution to key military outcomes; and provide spouses' perspectives on information, tickets, and travel (ITT), child development, and youth and teen programs.

Figure 53 shows the use of particular MWR programs and their importance to Navy spouses. Other results indicate that Navy spouses have very positive perceptions of all aspects of Navy MWR. About 90 percent rate Navy MWR facilities, services, programs, and customer service as expected or better than expected. Overall spouse satisfaction with MWR is about the same as that of Sailors and about 10 percentage points lower than that of Navy leaders. Over 80 percent of spouses consider MWR facilities and services to be important for their QOL: about half say MWR affects their desire for their spouse to remain in the Navy.

Ms. Carol Newell (NPRST) presented her analysis of the 2002 Spouse Quality-of-Life Survey, which was administered between July and December of 2002 [65]. She noted that an assessment of Navy spouses' QOL is needed to determine satisfaction with major life areas and how this affects spouses' encouragement of Navy members' careers. Areas examined were personal life, Navy life, awareness of Navy programs and services, and spouse encouragement of reenlistment.

Figure 53. Use and importance of particular Navy MWR programs to spouses[a]



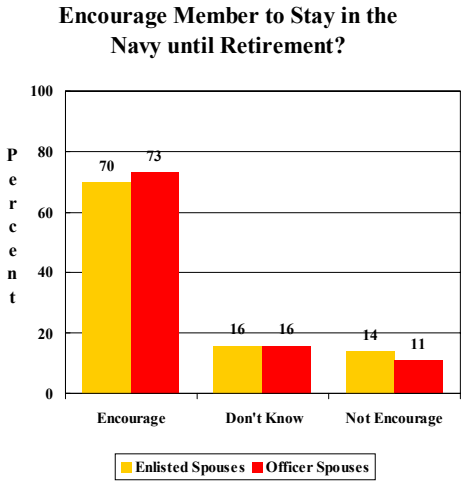
a. Source: Dr. Paul Rosenfeld and Ms. Zannette Uriell, "Results of the Navy Morale, Welfare and Recreation (MWR) Spouse Survey," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [64].

The results showed that Navy spouses are satisfied with most QOL domains, and the majority of them plan to encourage members to reenlist (see figure 54). Navy spouses were aware of most Navy programs and services and were very satisfied with Navy job security. Similar to members, spouses were least satisfied with standards of living and certain aspects of military life.

Figure 54. Most spouses encourage Servicemembers to stay in the Navy[a]

Spouses were less satisfied with Military Life than other aspects of QOL.

Despite dissatisfaction, most spouses report that they plan to encourage member to reenlist, both at next decision and until member is eligible for retirement.



a. Source: Ms. Carol Newell, "Results of the 2002 Spouse Quality-of-Life Survey," presentation at the *Fourth Annual Navy Workforce Research and Analysis Conference*, March 30, 2004 [65].

Conclusion

The *Fourth Annual Navy Workforce Research and Analysis Conference* brought together researchers from a variety of organizations, each working toward a common goal—the support of the CNO's guidance, the CNP's priorities, and the Navy's R&D priorities. Individual organizations' approaches and techniques may differ, but their contributions combine to form a comprehensive and coherent body of work. The research community's work presented at the conference lays the foundation for the development of a coherent human resource strategy for the Navy.

By providing a forum for the exchange of ideas and information, the *Navy Workforce Research and Analysis Conference* ensures that the research community will continue to support leadership's workforce priorities for years to come.

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