CRM D0017165.A2/Final
November 2007

The Seventh Annual Navy Workforce Research and Analysis Conference: The Road to a 2025 Total Force

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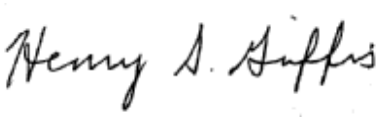
Approved for distribution: November 2007



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Contents

Introduction

The Deputy Chief of Naval Operations (Manpower, Personnel, Training & Education, or MPTE (N1)) is committed to improving the effectiveness of research and analysis done in the areas of manpower and training. N1 started the improvement process 6 years ago by asking CNA to organize a conference for the Navy manpower and training community leadership and the research organizations that support that community. Because of the success of the previous conferences, the Navy asked CNA to organize a seventh conference in May 2007. Once again, the goal of the conference was to help researchers better leverage their resources, provide more useful products, and improve the overall research program by:

- Improving leadership's understanding of the process for allocating and initiating studies
- Providing a forum in which leadership can articulate its vision of the top priorities for Navy manpower and training
- Improving communication and the links between researchers at different organizations within the community.

CNA manpower and personnel researchers presented their collaborative research efforts, which served as a catalyst for attendee discussions on research priorities and ongoing research on Manpower and Personnel matters in the Department of the Navy.

The theme of the *Seventh Annual Navy Workforce Research and Analysis Conference* was "The Road to a 2025 Total Force." The conference began on May 1st with opening remarks by the Honorable William A. Navas, Jr., Assistant Secretary of the Navy, Manpower and Reserve Affairs. The title of the keynote address by ADM Patrick M. Walsh, Vice Chief of Naval Operations, was "Navy 2025—Our Role in Joint Ops and Around the World."

A number of distinguished speakers addressed the plenary sessions. VADM John G. Morgan Jr., Deputy Chief of Naval Operations for Information, Plans and Strategy (N3/N5), discussed "Changing Navy Operations." Ms. Joyce Goia (The Herman Group), talked about the "Changing Marketplace." Mr. Arthur Mitchell, Executive Vice President, Director of Strategic Planning (Campbell-Ewald), discussed "Changing Demographics: What Do the Changes Mean to the Navy?" RADM Michael A. LeFever, Director, Military Personnel Plans and Policy Division (N13), talked about "The Future is Now—Personal Experience in Pakistan." VADM John C. Harvey, Jr., Chief of Naval Personnel, Deputy Chief of Naval Operations (MPTE), provided the wrap-up on "Workforce 2025—Today's Choices, Tomorrow's Leaders: What Does the Navy Need From MPTE?"

In addition, CAPT Edward Boorda and LCDR (Ret.) Bob Boorda presented the ADM J. M. Boorda Award for Outstanding Integration of Analysis and Policy-Making. Closing comments were provided by Ms. Nancy Dolan, Chief Strategist for Deputy Chief of Naval Operations (MPTE)/Chief of Naval Personnel.

The 2007 conference included a variety of presentations on past and ongoing research studies. Four breakout sessions focused on the following subjects:

- Session I
  - — Thinking About the Navy's Future
  - — Civilian Workforce Issues
  - — Competency Management
  - — Navy Quick Polls
- Session II
  - — Officer Education Issues
  - — Current and Future Initiatives in Manpower and Personnel Research
  - — Reserve Issues
  - — Requirements

- Session III
  - Officer Models
  - Global War on Terror (GWOT) Issues and Stressed Occupations
  - Recruiting/Attrition/Retention
  - Training and Fleet Performance
  - Diversity
- Session IV
  - Managing Personnel Safety
  - Compensation
  - Quality of Life
  - Community Management Models
  - Supply Chain Issues.

The following sections of this report contain short descriptions of all briefings presented in the breakout sessions. These descriptions represent the collaborative efforts of the author of this report and the presenters. The briefings from this year's conference, as well as from some previous years, are available at http://www.sm.nps.navy.mil/nwc/07/index.html.

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Research Presentations: Session I

Thinking About the Navy's Future

Barriers to U.S. Navy Active–Reserve Integration: Promotion Policies

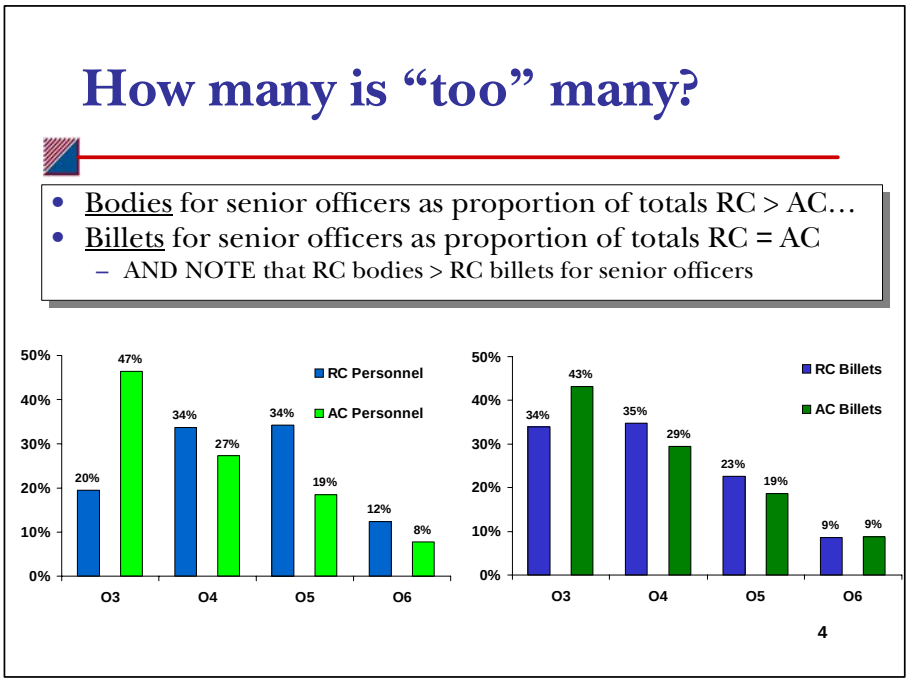
Dr. James Grefer (CNA) and Dr. Peggy Golfin (CNA) presented the results of a study that looks at possible barriers to active component/reserve component (AC/RC) integration, and focused the talk on one specific problem: officer promotion policies.

Navy leaders interviewed by the study team reported that there appeared to be an inordinate number of senior officers in RC, and that RC officers were not as ready as anticipated when they were activated. As a result, they're often placed in administrative jobs or as space holders for deployed active duty. To empirically confirm or reject these claims, the analysts examined the number of officers in R/C and looked at the skill sets of RC officers, especially Navy-specific and civilian-equivalent skills.

They found that the number RC senior officers as a proportion of the total was greater than that of AC senior officers. Further, the number of RC bodies was also greater than RC billets for senior officers, suggesting that there might have indeed been "too many."

In the area of officer skills, the analysts postulated that Navy occupations require a varying mix of Navy-specific and civilian-equivalent skills. They further surmised that Navy-specific skills are normally learned and maintained in Navy settings, and Navy personnel work in Navy settings primarily when they are on active duty. Furthermore, RC officers have and receive substantially less total sea and contingency experience at a given rank. As a consequence, AC personnel would normally have a higher set of Navy-specific skills for a given length of service.

Figure 1. Senior officer proportions of total RC and AC[a]



a. Source: Dr. James Grefer and Ms. Peggy Golfin, *Barriers to U.S. Navy Active-Reserve Integration: Promotion Policies*, briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

However, they found that RC and AC officers in similar communities and years of service were approximately the same rank, even in highly Navy-specific communities, such as Naval Surface Warfare Officers. This suggested that the promotions were parallel between RC and AC officers. One factor in RC officer promotions is skill development from experience and training, which we would expect. However, such promotion policies as "time in service" and "up or out" statutes, and a general perception that RC officers need to be promoted or they won't affiliate, can lead to parallel promotions among RC and AC officers.

Dr. Grefer concluded that current promotion policies create different sets of Navy-specific skills for the same rank/community in AC and RC. This is inconsistent with the Navy's vision of a "competency-based" personnel system. Parallel promotions could create barriers to

integration of RC and AC by adding to the AC "cultural bias" that RC is not always "ready." Further, these parallel promotions could create readiness issues if requirements and unit commanders don't recognize the existence of different sets of skills, and they could limit the ability of the Navy to use the SELRES in a "plug and play" manner. Finally, these promotion policies could hinder personnel transitions from RC to AC since officers often need to "reset their clock" in order to compete in the AC.

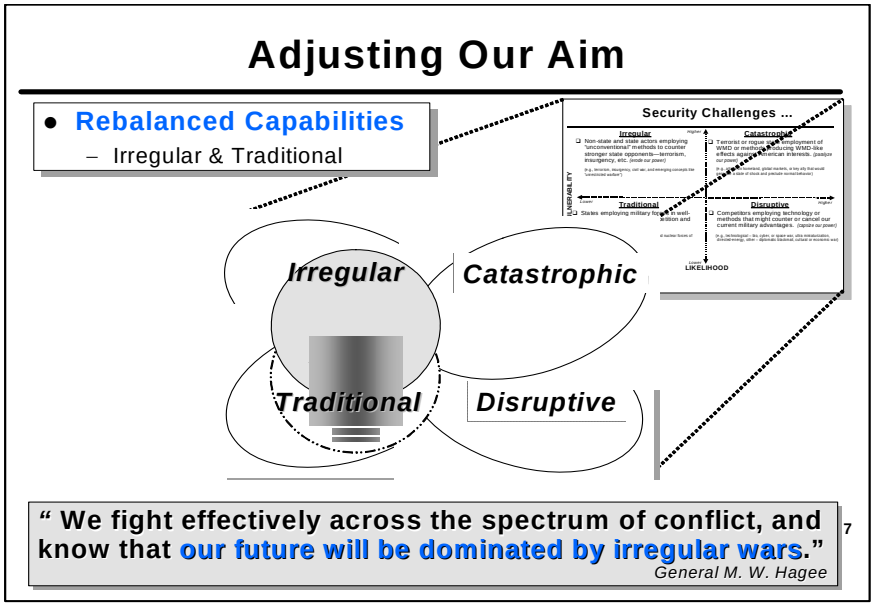
Dr. Grefer recommended that more studies be done on Navy-specific skills, and that they look at how different skill sets among the same rank could affect job performance. He further recommended several policy changes for consideration. First, the Navy should try to amend promotion policies to allow RC and AC officers in the same community with the same YOS to have different ranks. Second, the Navy should allow RC officers more opportunities to obtain comparable competencies. He stated that such changes would require changing Title 10 promotion laws.

The 21st-Century Marine Corps

Colonel Otto Rutt (USMC M&RA Manpower Plans and Policies) discussed CMC Planning Guidance that lays out priorities—personnel being number one. In addition, the guidance includes planning to rightsize the Corps and deployment ratio, prepare for a wide spectrum of conflict, modernize for readiness, improve quality of life (QOL) for Marines and families, exercise core values and warrior ethos, and assume a posture for the future. Some of the overarching principles he mentioned include maintaining the warrior ethos that every Marine is a rifleman. Another principle is that Marines are forward deployed and fight as part of a combined armed team in a joint environment. Marines are also culturally aware. He said that Marines are made to win the Nation's battles and create quality citizens. Also, total force integration (Active-Reserve-Civilian-Contractor) can be achieved through organization, training, warfighting, and personnel management (MCTFS). The 5R's—Right Marine, Right Place, Right Time, Right Skill, and Right QOL—are important to success. It's important that authorities, practices, and systems support priorities. Finally, if it's not broke, don't fix it.

Col Rutt said that it's important to continue to embrace change, consider alternatives, and build on the strengths of today's force. It's also important to build capabilities to help Joint Force Commanders (JFCs) as they attempt to prevent instability, enable stability, and rapidly transition back and forth as the "Nation's Premier Expeditionary Force-in-Readiness." Challenges, concepts, and capabilities must be considered. The strategic landscape in this new century presents a complex mix of traditional and nontraditional challenges. The Corps must adjust its aim by rebalancing capabilities to deal with new challenges across a spectrum of conflict from traditional and disruptive to nontraditional and catastrophic. Col Rutt believes that the Corps will need a balanced force of MAGTF elements that remains constant, and that COCOMs will need increased support for the long war. To reduce COCOM OPLAN risk, there needs to be an increase in the (1) percentage of AC sourcing; (2) capacity for Theater Security Cooperation events; (3) intelligence, reconnaissance, and UAV capacity; (4) civil affairs, information operations, and regional expertise planning; and (5) communications and coalition liaison capacity.

Figure 2. New challenges across the spectrum of conflict[a]



a. Source: Col Otto Rutt, *The 21st-Century Marine Corps,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

According to Col Rutt, some key aspects necessary to the future success of the Corps have evolved. For example, U.S. Marine Corps Forces, Special Operations Command (MARSOC), which plays a supporting role to the COCOMs and other agencies, was established in 2006. Enduring, integrated concepts will drive the design of future forces and establish the framework for operational efforts. Such concepts include sea basing and distributed operations, which provide the capability to project power ashore for a full spectrum of operations from disaster relief to armed threats. Col Rutt also discussed some emerging, maturing concepts, such as forward presence, security cooperation and counterterrorism, crisis response, forcible entry, prolonged operations, and countering irregular threats—a new approach to counterinsurgency.

The Future of Defense Manpower Analysis: Opportunities for Meaningful Contributions

A presentation by Dr. Russell Beland (Deputy Assistant Secretary of the Navy, Manpower Analysis & Assessment) examined a range of defense-related human capital and manpower issues and the prospects for analytic contributions to various issues and topics. He emphasized areas of analytic research that appear promising and existing research topics with room for improvements in analytic understanding. Specifically, Dr. Beland addressed the following topics/questions:

- Do discount rate studies inform decision-making?
- Manpower requirements and experience profiles: what sort of force do we really want?
- Efficiency and optimization: do they make sense for a military force?
- Peacetime operations and wartime readiness: what are the tradeoffs?

Dr. Beland discussed the general areas of inventory models, retention, and the use of discount rates, which have long been a major factor in decision-making. He argues that it may not necessarily be true that servicemembers' behavior is driven by traditional discount

rate analyses. According to Dr. Beland, evidence suggests that any attempt to use discount rates to explain servicemember decisions implies that their behavior is inconsistent and irrational. The time value to money is primarily a portfolio management concept for people and institutions with accumulated wealth rather than a model for an individual's preferences and behaviors. Furthermore, discount rate analysis has little predictive power in this context. Overfocusing on expected future earnings has led us in many problematic directions. It has led to profound misunderstandings of the military retirement system, it has created a mind set that money solves inventory problems, and emphasis on compensation has contributed to increased costs of servicemembers. Dr. Beland suggests using some combination of rational expectations and permanent income hypothesis as a possible replacement of expected net present value to impact retention.

Dr. Beland also discussed "requirements" at the servicewide, or macro, level. He said that requirements analysis on a macro level is almost nonexistent. Rather, it appears that current inventory requirements are more a function of the career profile (i.e., lack of lateral entry, the retirement system, and limits on "control grades," etc.). Dr. Beland said the approach that is being used is both undesirable and dangerous. In this approach, attempts have been made to adopt more flexible and targeted compensation and personnel management. The problem is that the underlying traditional systems remain in place, resulting in system add-ons and added costs on top of the adequate base compensation system. Recruit standards become needlessly high, along with offers of signing bonuses, GI Bill, and advanced ranking to get them. Dr. Beland recommends a realistic analysis of requirements starting with a skeptical review of recruit standards and a life-cycle costing approach to personnel.

The final topic of Dr. Beland's presentation was the issue of outsourcing and military/civilian conversion. In the frenzied search for conversion and outsourcing opportunities wherever feasible, a downside to this approach has been noticed. The Army and the Marine Corps don't have enough total active duty to rotate through theatre at acceptable paces. According to Dr. Beland, at least part of the reason is the reduction of military personnel in non-military-essential

positions over the years. The military needs to plan for operations during major disruptions and should build in a certain amount of redundancy and excess capacity—even deliberate inefficiency—in peacetime. Also, the Navy is finding that giving up in-house technical and engineering capabilities at the system commands has led to acquisition problems. Furthermore, Dr. Beland stated that the cult-like devotion to reducing manpower has led to bad decisions in such areas as crew levels for surface combatants. He believes, for example, that billions have been and will be spent on R&D, procurement, and shore-side maintenance and support only to save a few extra billets on each of the DDG-1000 class ships.

Dr. Beland recommends trying to understand why using military personnel may be (or may appear to be) a more expensive option rather than reducing endstrength to reap only marginal cost differences among military, civilian, and contracted personnel. In terms of quality, flexibility, productivity, and centralized command and control, military personnel may well be more cost-effective than realized. Finally, Dr. Beland noted that any endstrength conversion that causes reliance on reservists in the event of major mobilizations is likely to be inefficient.

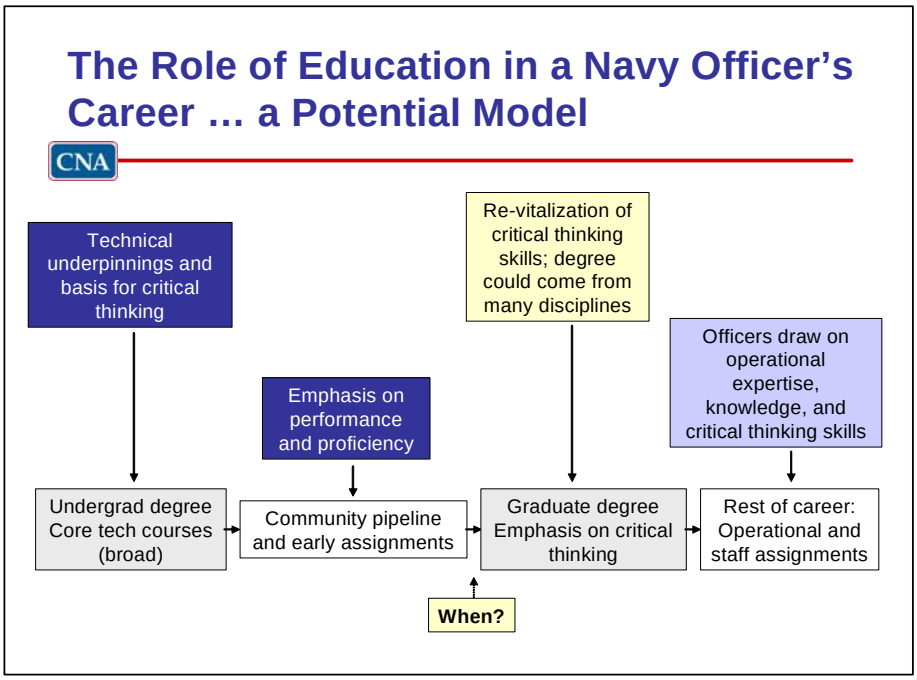
Education Strategy Development

Research by Dr. David Rodney (CNA) on education strategy development addresses the 2007 CNO Guidance to "complete and execute a Navy Education Strategy, emphasizing the importance of critical thinking, leadership, cultural awareness, jointness, innovation, and adaptability." The CJCS vision first calls for joint officers to be built upon service officers. Fully qualified and inherently joint 06s are the focal point of development. The vision also calls for a joint learning continuum that includes four interdependent pillars: Joint Individual Training, Joint Professional Military Education, Joint Experience, and Self-Development. In addition, all colonels and captains are skilled joint warfighters who are strategic-minded, critical thinkers.

The education strategy design encompasses undergraduate education requirements, career path/supplemental education, and requirements for successful 06s and above. The initial focus of

Dr. Rodney's plan was on URL officers. The methodology involved gaining an understanding of requirements from the operational commanders and community leaders through guided discussions. These results were then taken to the education community to determine potential education contributions. The study also involved (a) conducting joint officer (JO) focus groups to understand expectations, (b) considering other models, other services, and other nations, and (c) combining the analytic results. Dr. Rodney then developed options for career paths that include continuing education focused on Navy needs, and he presented a potential model for the role of education in a Navy officer's career.

Figure 3. A potential career model for Navy officers[a]



a. Source: Dr. David Rodney, *Education Strategy Development,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Discussions for the education strategy were held with operational commanders, community leaders, and Navy educators to answer such questions as (1) What are the skills required for officers to fully perform their work at both Navy and joint commands? (2) What are the

implications of these requirements on careers, assignments, and promotion criteria? and (3) What education and training can help meet the requirements—namely, what additional education is needed and when should it be provided? The participants were from a wide variety of operational commander environments (e.g., complex theater, "3" theaters and operational (NORTHCOM) and training focus). Some of the issues discussed were culture of leadership vice culture of staff, ability to retain and reward excellent staff officers, tech/non-tech, language vs. culture and critical thinking (e.g., What is it? When is it needed? How do you get it?).

According to Dr. Rodney, community leader perspectives held that a technical degree is vital for some communities, the training schedule is already extremely tight, changes have been made recently to address joint requirements, and the process can accommodate talented staff officers. Another issue is that the tightness of career paths makes things extremely challenging to fit into the schedule. The length of sea tours for Aviation, Submarine, and SWO is 10 years, shore tours are 7 years (8.5 for SWO), and operational training is 3 years (1.5 for SWO). Shore tours must fit in JPME1, JPME2, joint tour, graduate education, and Navy shore assignments. Navy educators are concerned that the Navy does not sufficiently value education. The Navy does welcome a strategy with enough specificity to design education programs and align resources. There are programs that are oriented toward the needs of the community leaders and correcting the identified staff deficiencies. All have ideas for how to expand and/or add programs focused on critical thinking. The Submarine, Surface, and Aviation JO focus group members stated that they did not see a requirement for a tech background, but it was apparent during the discussions that their perspectives were limited. All JOs expected to get a Master's degree, apparently motivated by a mix of personal and Navy career advancement aspirations. JOs report limited support from their commands. Dr. Rodney recommended continuing work on defining "tech" for undergraduate education. He also said it's important to determine "when" the shift to critical thinking should be made. Work should be done with educators to define critical thinking and identify programs to develop it. Finally, he said that work should be done with community leaders on career path management that includes education opportunities.

Civilian Workforce

The Changing Face of the Civilian Workforce

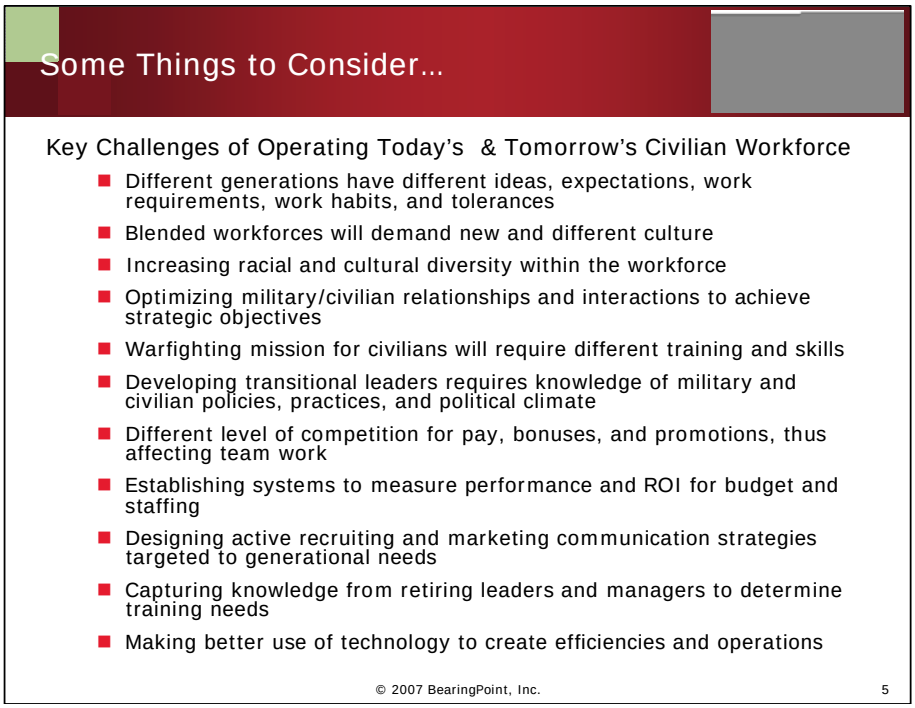
The Honorable Ruby Butler DeMesme (BearingPoint) began the presentation by stating that the civilian workforce is undergoing changes that are also reflected in the DoD environment. There are new roles and missions, as well as new challenges with respect to managing, recruiting, retaining and developing a workforce of blended generations. Factors that are driving changes needed to ensure mission readiness include legislative and regulatory agenda, strategic thinking about business goals and force requirements, and tactical shaping of the workforce. New roles and missions must consider a mobile and global workforce. Role expansion, leaner staffs, and limited budgets are a new reality. Furthermore, the right staff with the right skills must be attracted and retained. In addition, the focus must be on innovation, rather than rote compliance.

Operating in the civilian workforce of today and tomorrow is challenging. The workforce is diverse in terms of generational differences and expectations, race and culture, and work/lifestyles. Military/civilian partnerships must be capitalized upon in order to achieve the strategic objectives of each sector. Transitional leaders must have a broad base of knowledge spanning military and civilian policies, practices and politics. Furthermore, the workforce is increasingly more competitive, impacting marketing and recruiting strategies as well as pay, bonus and promotion incentives and policies. Finally, operational efficiency requires establishing systems for performance measurement and ROI for budget and staffing, transferring knowledge from retiring managers and leaders, and making the best use of complex technologies.

Mrs. DeMesme discussed the implications for Human Capital Management (HCM) striving to recruit, retain, manage and develop a changing workforce. Four generations (Matures, Baby Boomers, Generation X, and Millennials) of employees are converging in the workplace with differing interests, career goals, and work attitudes. This will require different methods for recruitment stressing the benefits that target each audience. Teamwork effort must include

cross-generational communication, collaboration, and compromise. Retention strategies will need to be tailored to meet different generational needs. Strong employee feedback and management-employee relationships are critical. Research shows that poor supervisor-employee relationships are the main reason for employee turnover. Effectively managing a multi-generational workforce requires a flexible leadership style, as well as quick and strategic communication. Managers will also need to consider the impact of work-life balance on team performance, use performance feedback, and incorporate pay-for-performance. Structured career paths and e-learning media will be important aspects of talent development.

Figure 4. Civilian workforce challenges[a]



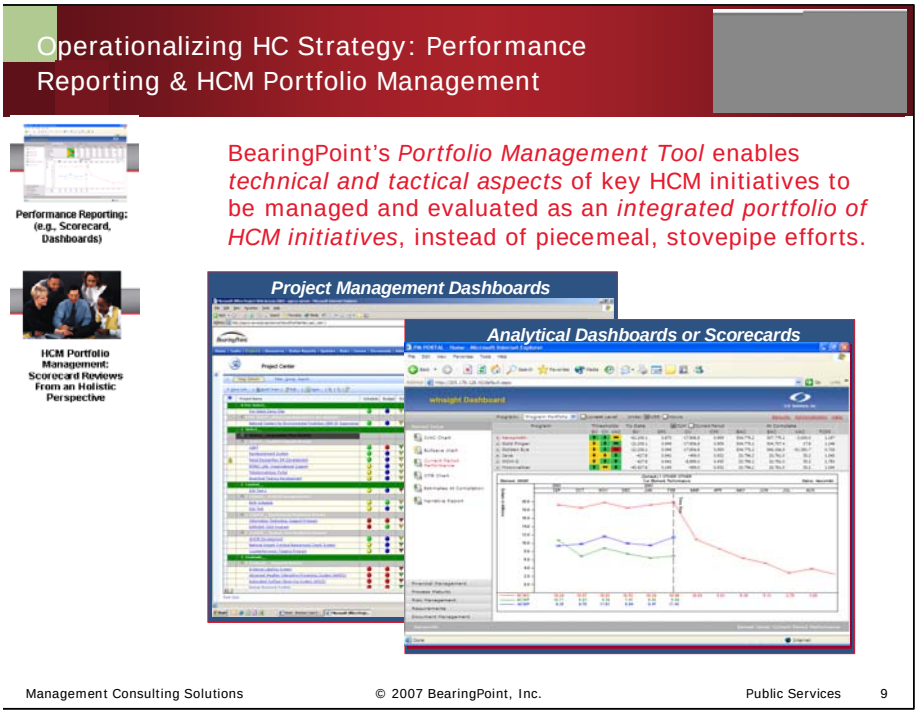
a. Source: Mrs. Ruby Butler DeMesme, *The Changing Face of the Civilian Workforce,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Mrs. DeMesme stated that establishing organizational imperatives for tailored, flexible policies and solutions, commitment to building blocks for HCM capability (technical, tactical, prescriptive, descriptive and diagnostic), and fact-based decision making are all key to mission readiness and transformation of the workforce. According to Mrs. DeMesme, the next steps involve (1) leveraging the advantages of a blended workforce, (2) designing organizational strategies to accommodate generational differences, and (3) training managers and staff to effectively work with a diverse and multi-generational workforce. In summary, Mrs. DeMesme restated that the face of the civilian workforce is changing. The government will have to be innovative in recruitment, retention, management, and talent development to meet the needs of the multi-generational workforce. Leaders will be required to leverage existing flexible military personnel programs, training, and practices that can be adapted to civilian personnel. They must evaluate generational differences and design policies and programs to meet mission needs. Managers will need to be educated on the changing workforce and the requirement to make institutional changes. Finally, organizations must conduct ongoing program effectiveness and employee satisfaction surveys to assess progress and continuously revise policies and practices as needed.

Operationalizing Human Capital Strategy To Achieve Results

Ms. Cathi Jack and Ms. Jennifer Spicer (both of BearingPoint) began by stating that the biggest challenge to organizational strategy is that only 10 percent of organizations actually execute such strategies. They discussed the common barriers to strategy execution, such as vision, people, management, and resource barriers. Closing the gap between strategy and action is the key. Human capital strategies often lack clarity, and they are too broad. They are also challenged by stakeholder political sensitivities and competing interests. Other challenges in the way of strategy execution include complexities of volume and scope, poor alignment of leadership vision and the "doers," lack of approach integration, staff incompetence, inadequate tools, and insufficient funding. Ms. Jack and Ms. Spicer believe that BearingPoint's Portfolio Management Tool enables organizations to get beyond these challenges by integrating key components to develop and to operationalize human capital strategy.

Figure 5. BearingPoint's integrated portfolio of HCM initiatives[a]



a. Source: Ms. Cathi Jack and Ms. Jennifer Spicer, *Operationalizing Human Capital Strategy To Achieve Results,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

According to Ms. Jack and Ms. Spicer, most organizations falter in the process of starting up key initiatives and projects, developing measures and performance indicators, and conducting cost analysis and business case analysis. The tools and techniques that BearingPoint employs for operationalizing HC strategy include a strategy articulation map, performance measures, and both cost analysis and business case analysis. Implementing change management is another critical component. Change management allows leadership to assess and monitor organizational risk associated with the initiative. Leaders are also aligned and mobilized to establish agreements and leverage assets throughout the initiative. Stakeholders and others are engaged, and communication is promoted between groups and individuals. Furthermore, change management prepares and equips the workforce to operate effectively in the workforce environment.

Finally, organizational impact is addressed by realigning jobs, performance measures, and organizational structures.

Ms. Jack and Ms. Spicer also presented a case study of the NCIS Human Resources Strategic Plan. The plan establishes bold strategies for strategic alignment, recruitment, retention, relocation, diversity, performance integration, and knowledge management. The Human Resources Strategic Articulation Roadmap for the plan incorporated vision, values, strategic goals, and the objective and key initiatives. Key performance indicators were also identified. Ms. Jack and Ms. Spicer reported that the NCIS Human Resources Strategic Plan had many successes. First, a strategic articulation roadmap was developed with initiatives that could help the Human Resources directorate reach its organizational goals as laid out in their strategic plan over the next 3 to 5 years. Second, the plan achieved buy-in from all organization leaders. The initiatives were the product of the meeting attendees, and all participants had an opportunity to participate in their development. Third, excellent communication materials were created. The final product was understandable for all audiences and was used successfully as a communications vehicle within the agency and with the Human Resources directorate. Fourth, NCIS is currently executing what was identified in the plan. The primary projects that it has taken on were identified as high priority during the strategic planning sessions.

Ms. Jack and Ms. Spicer said that the NCIS Human Resources Strategic Plan also provided some lessons learned. First, a strategic plan needs to be aligned with the budget and planners should be aware of budget restrictions when prioritizing initiatives. Second, the strategic plan owner should be identified. They stated that, since a strategic plan is a living document that needs to be reevaluated on a regular basis, before embarking on the execution of a strategic plan, assurance is needed that either an organization or a person owns the maintenance and upkeep required to keep the plan fresh.

In summary, Ms. Jack and Ms. Spicer reviewed the characteristics of their approach. First, it is a mission-cognizant approach that explicitly links strategies to action through a disciplined method focused on execution. The focus is on what's important to drive value. Links are

created between high-level strategy to day-to-day operations, the activities people perform, and projects managed. Furthermore, the approach requires systems thinking and a holistic approach to managing HCM projects and initiatives. The approach is grounded in proven business management methods for ongoing performance and continuous improvement. The approach leverages technology to gather the right data and analytics for specific insights necessary to enable mid-course corrections.

Modeling the Future Workforce: Forecasting Workforce Changes for Your Community

As federal agencies brace themselves for the impact of a predicted retirement wave, they are faced with important questions regarding the management of their human capital. Dr. Jason DePasquale (LMI) presented research that introduces an automated hiring-and-promotion-model tool that can be implemented to address key human capital issues. Agencies are asking human capital questions, such as the following: Where should the hiring efforts be focused over the next 5 to 10 years to maintain the workforce needed to accomplish our mission? Is there a sufficient supply of talent in our agency to meet anticipated promotion requirements over the next 5 to 10 years? What talent management and human capital strategies should we pursue given the answers to the above questions?

Dr. DePasquale's research introduces an automated hiring-and-promotion-model tool that can be implemented to answer such questions. In addition, LMI applied this automated tool to the Navy Financial Management (FM) Community. First, it was applied to project Navy FM attrition. Second, it was applied to identify the number of candidates eligible for promotion from within the Navy FM community to fill vacancies created by attrition. It was also applied to forecast the accessions necessary to fill remaining vacancies not filled by promotions from within the Navy FM community.

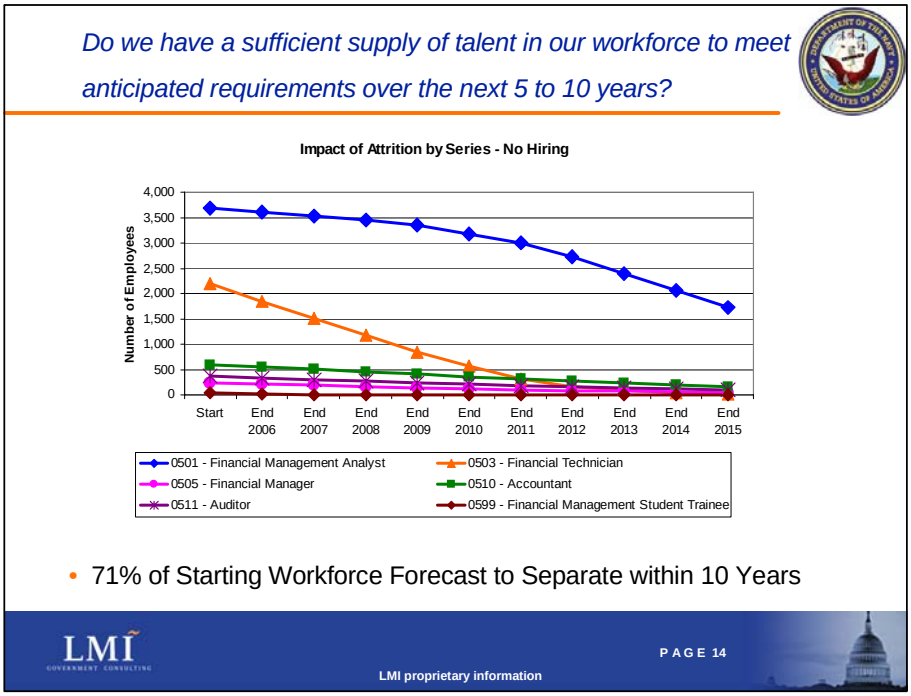
The research approach uses the hiring and promotion projection process, which entails knowing where you are (e.g., starting population, loss rates, and positions) by skill, organization/location, age, time in service, grade, and time in grade. The next step in the process

is to set parameters (e.g., target fill rates, minimum time in grade, mix of local and distant promotions, and mix of new hire and transfers in). Another step is to project the future and close the gaps (e.g., forecast losses, forecast promotions from top down, determine hire requirements, repeat for each projection year). The final step is to determine the interventions by building strategies to proactively plan for losses, promotions, hires, and transfers.

According to Dr. DePasquale, the Department of Navy (DoN) FM community may face some challenges in future years. As a result of Dr. DePasquale's research, LMI proposed three categories of interventions: (1) recruitment, (2) retention, and (3) succession planning. The model was applied to the starting workforce (end of CY 2005). Ten-year projections reflect annual workforce changes, attrition, promotions, and accessions. The projections were calculated with and without hiring. Two workforce demand scenarios—status quo demand and 10-percent reduced demand (with 1 percent annually equaling 10 percent by end CY 2015)—were analyzed.

Dr. DePasquale's research model answers several key questions. Do we have a sufficient supply of talent in our workforce to meet anticipated requirements over the next 5 to 10 years? The analysis indicates that 71 percent of the starting workforce is forecast to separate within 10 years. Do we have an adequate pipeline to support our leadership promotion requirements? The mid-level workforce (grades 9 through 12) forecast reduction is 76 percent. The senior workforce (grades 13 through SES) forecast reduction is 23 percent. In conclusion, Dr. DePasquale said that the potential exists to fill the senior leadership requirements at SES and GS-15. He also said that some full-performance level and leadership requirements will likely not be satisfied by promotions from within the Navy FM workforce. Finally, he noted that the number of required accessions increases annually and that most accession forecasts are at grades 5, 7, and 9.

Figure 6. Workforce supply and anticipated requirements[a]



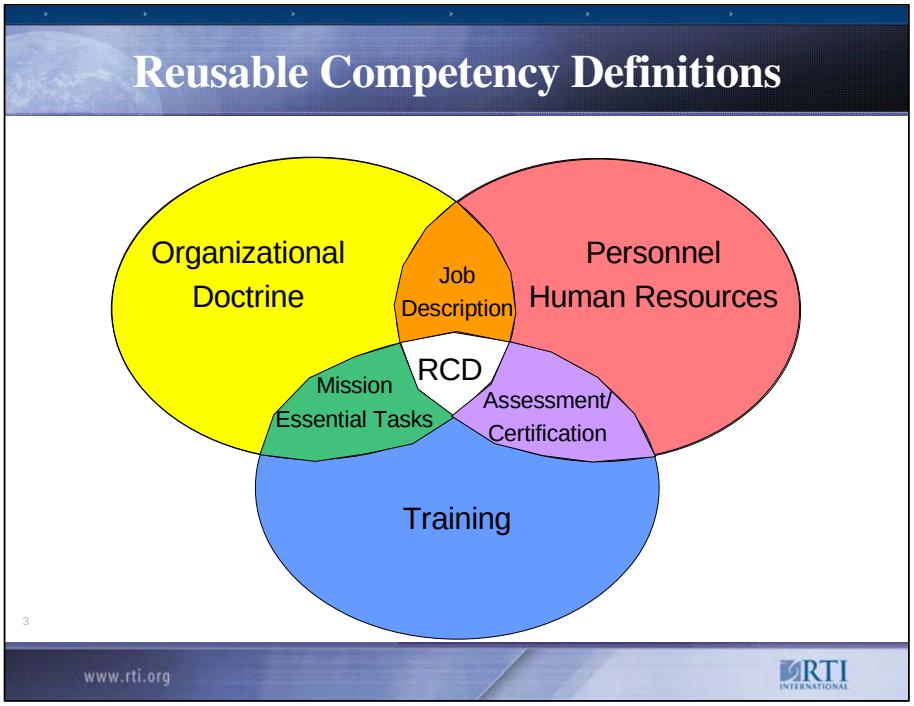
a. Source: Ms. Sue Tardif, Jason DePasquale, and Mrs. Sue Rosenberg, *Modeling the Future Workforce: Forecasting Workforce Changes for Your Community,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Competency Management

Linking Reusable Competency Definitions to Learning Activities and Risk

Dr. Geoffrey Frank (RTI International) began the presentation stating that the lack of standardization of competency records hampers enterprise integration efforts, preventing organizations from linking their personnel databases to their training and assessment efforts. He said that, in particular, it is difficult for unit commanders to integrate their personnel training records, Mission Essential Task Lists (METLs), and training resources to prepare effectively for rotations into combat zones.

Figure 7. Components of Reusable Competency Definitions (RCDs)[a]



a. Source: Dr. Geoffrey Frank, *Linking Reusable Competency Definitions to Learning Activities and Risk,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

According to Dr. Frank, the IEEE Learning Technology Standards Committee is developing a standard for Reusable Competency Definitions (RCDs) to enable effective exchange of worker competency information. RCDs capture information (a) about knowledge through linkage to organizational doctrine or technical manuals, (b) about skills through linkage to mission essential tasks (METs), and (c) about aptitudes through linkage to assessment/certification information. Competency definitions that are standardized help to develop job descriptions and provide a step toward automating the linkages between databases for personnel record-keeping, experience level information, and training. The IEEE standard is based on an existing IMS specification for which there is existing practice. The RCD standard supports the use of existing taxonomies to define and organize competencies. For example, a set of taxonomies such as the following might be used to instantiate the competency description (taxonomies

are indicated in capital letters): Perform SKILL with VEHICLE under CONDITIONS to STANDARD. The taxonomy CONDITIONS is defined in terms of a VEHICLE_CONFIGURATION subtaxonomy (developed by the Federal Highway Administration) and an ENVIRONMENT subtaxonomy (defined in the Army Universal Task List documentation) having components of WEATHER, TIME_OF_DAY, and TERRAIN.

Dr. Frank said that RTI International has been developing competency descriptions using existing taxonomies that provide linkages between METL and associated individual tasks, taxonomies of training scenarios, and risk data. The linkages and associated rollups can assist the unit commander in tailoring training scenarios to unit strengths and weaknesses and unit METL. Training analysis can lead to several goals: reduce accident rates, reduce accident severity, reduce training time, and improve efficiency of training device use. The linkages also allow training management to judge the alignment of training scenarios in use at proponent schools with event cost and severity data that are risk measurements. Better alignment through the use of ontology allows more records to be matched. In conclusion, Dr. Frank stated that future research will focus on aligning accident conditions with training conditions (i.e., time of day, weather, and urban/rural settings) and will link competency definitions of condition to training and environments.

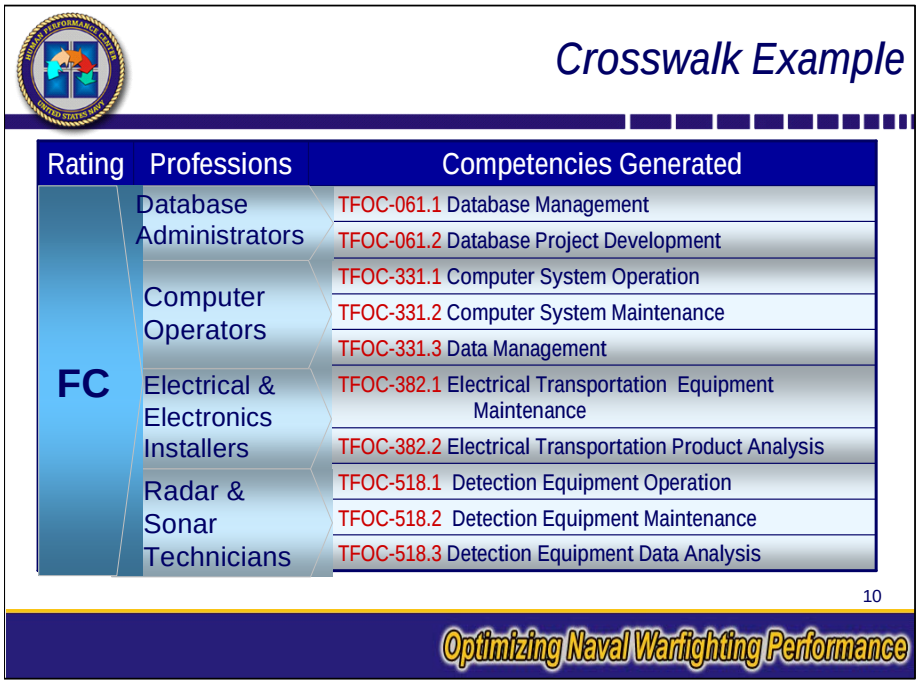
Designing a Total Force Competencies Architecture for the Navy

Dr. Burt Krain (Human Performance Center (HPC)) and Ms. Lisa Gabel (HPC) discussed ways to design a total force competencies architecture for the Navy. According to their findings, meeting the challenges of a changing workforce requires the reengineering of traditional methodologies and realignment of the work, worker, and workplace into a manageable opportunity that places competencies at the forefront of a strategy for our people.

Dr. Krain believes that leveraging the crosswalks that joint interoperability brings by recognizing the commonality of knowledge, skills, and abilities across both work and worker allows the Navy to be poised to meet the challenges of a 2025 Total Force with intelligent design of

its assets through a competency-managed workforce. Phase I involved building a crosswalk, developing standard operating procedures, and incorporating titles, descriptions, and competencies into a viewable crosswalk platform. The competencies are then mapped to position requirements (i.e., billets) and competency attributes (i.e., functional requirements), creating a crosswalk from ratings to professions, and the competencies generated. This architecture provides a standardized, reusable, and repeatable process that can be validated and updated as required. In their presentation, Dr. Krain and Ms. Gabel explained the unique challenges they had to overcome to develop a set of standard operating procedures for the Navy to launch a total force effort that would provide a uniform and quality-based effort to bring competencies to its workforce.

Figure 8. Crosswalk of occupational competencies[a]



a. Source: Dr. Burt Krain and Ms. Lisa Gabel, *Designing a Total Force Competencies Architecture for the Navy,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Krain and Ms. Gabel said that, by drawing on work conducted by the Department of Labor, other branches of the service, NATO allies, domestic and foreign governments, and private industry best practices, the Navy has developed a blended solution that leverages the best ideas with authenticated sources of occupational information to arrive at a solution that efficiently brings all elements of our total force under one competency model for the Navy.

A Preliminary Approach To Identify Competencies Based on Standard Billet Information

Mr. Kenneth Robinson (SERCO), Mr. John Durgala (SERCO), and Ms. Alison Reyes (SERCO) presented a study of how the Navy can benefit from standard and verifiable processes to identify competencies associated with current and future manpower requirements. The researchers began by stating that competencies associated with Navy manpower requirements must be reevaluated as missions, doctrine and operational procedures, and equipment platforms are modified in reaction to changing threats. In the study, they explore the feasibility of identifying competencies based on standard billet descriptors that are available in the Navy information systems.

According to Mr. Robinson, the preliminary approach starts with standard position qualification descriptors included in the Total Force Manpower Management System, such as Enlisted Management Community, Navy Enlisted Code, Officer Designator, and Navy Officer Billet Code. Those qualification descriptors are mapped into a universal occupational classification system developed by the Bureau of Labor, the Standard Occupational Classification (SOC) System. The SOC System provides a conduit to further link position qualification descriptors to competencies in the Nation's primary source of occupational information, the Occupational Information Network (O*NET) database. The O*NET database identifies competencies required to perform in SOC occupations along with level of importance and skill level.

Mr. Robinson said that the results of the preliminary approach are captured in an information system available on the internet. Competency information may be recalled based on a variety of conditions. In

conclusion, he said that refinements to the preliminary approach are planned. One refinement incorporates Latent Semantic Analysis techniques to examine detailed text descriptions of duties required in Navy jobs to produce more exact mapping to SOC codes and O*NET competencies. A concept for comparing individual qualifications to position competency requirements has also been developed. The concept is the basis of an optimal personnel assignment protocol and competency gap analysis.

Figure 9. Descriptors mapped to standard occupational classifications (SOCs)[a]

Examples of Occupation Mapping

Enlisted

Descriptor (EMC)	SOC
Admin - Yeoman (B750)	43-4161:HR assts, except payroll & timekeeping
Admin - Legalman (B630)	43-6012:Legal secretaries

Officer

Descriptor (Designator)	SOC
250x - Judge Advocate General Corps Officer	23-1011:Lawyers
210x - Medical Corps Officer	29-1062:Family and general practitioners

Descriptor (Subspecialty)	SOC
RESOURCE MGMT & ANALYSIS - Financial Management – Comptroller (3111)	11-3031:Financial managers
MEDICAL CORPS - Anesthesia, Subspecialty (15B1)	29-1061:Anesthesiologists

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a. Source: Mr. Ken Robinson, Mr. John Durgala, and Ms. Alison Reyes, *A Preliminary Approach for Identifying Competencies Based on Standard Billet Information,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

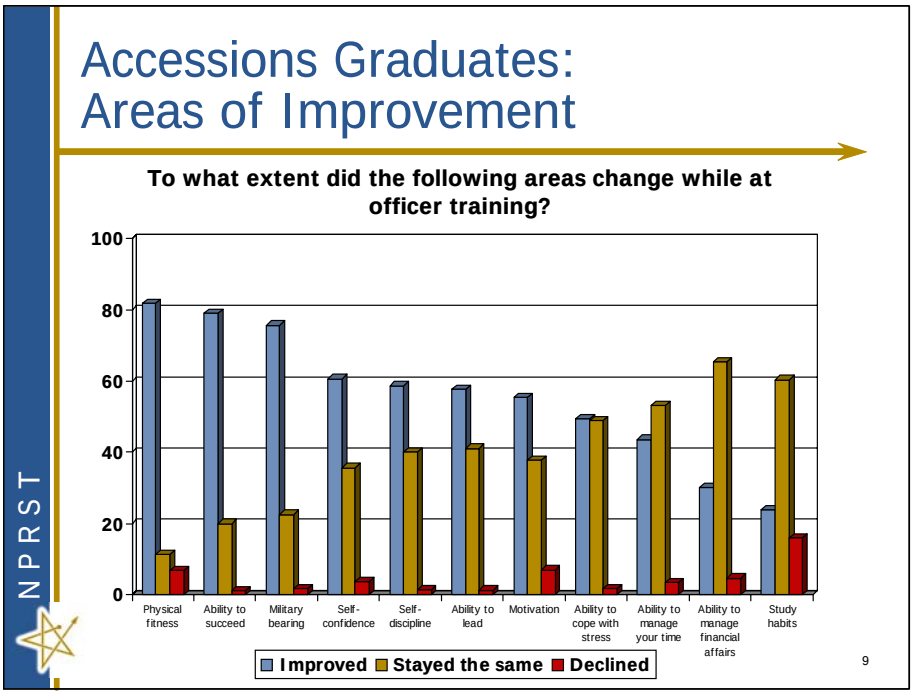
OfficeR Competency Assessment (ORCA): Officer Accession Research in the Navy

Dr. Rorie N. Harris (Navy Personnel Research, Studies, and Technology (NPRST)) began by stating that, historically, most of the Navy's accession research has focused on the demographic characteristics of enlisted personnel and has neglected the officer community. The Officer Board of Advisors for the Navy recognized this lack of information on Navy Officer Accessions and recommended that NPRST coordinate with the Naval Service Training Command (NSTC) to conduct research on the officer community and assess junior officers in terms of their level of preparedness for their initial jobs in the Navy.

According to Dr. Harris, the ORCA project uses a longitudinal design to follow cohorts of officers through their initial officer training and into their first tour in the fleet. The project has three key objectives: (1) to evaluate officer accession training, (2) to evaluate new officers' preparation for their first jobs in the fleet, and (3) to identify the characteristics of high-performing junior officers. These objectives were accomplished through the development of a unified set of instruments that provide valuable information on officer training and success to NSTC leadership and each officer accession source.

Two questionnaires are currently in use: a New Officer Survey and a Training Graduate Survey. The research design entailed a longitudinal tracking survey that tracked officers and officer candidates by participation in focus groups from the time they began officer training to their assignments to the fleet. The following competencies were measured: adaptability/flexibility, self-reliance, confidence/self-sufficient, resourceful, integrity/ethical, willingness to learn and improve, achievement motivation, dependability, stress tolerance, maintains composure, social orientation, likes team work, decisiveness, and attention to detail. Research results indicated that new officers expect to improve in every area as a result of training. The highest improvement expectations (over 80 percent) were in the categories of physical fitness, self-discipline, ability to lead, and motivation. About 20 percent of the participants indicated that their expectations about their ability to succeed would decline. Upon graduation, the participants showed improvements or stayed the same in each category.

Figure 10. Actual changes measured after officer training[a]



a. Source: Dr. Rorie N. Harris et al., *Officer Competency Assessment,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Harris said in conclusion that fleet feedback provides the key pieces of information regarding the links between job performance and training preparation. The next step is to develop a web survey system for greater flexibility of data collection and an online query system to provide data to commands in near real time.

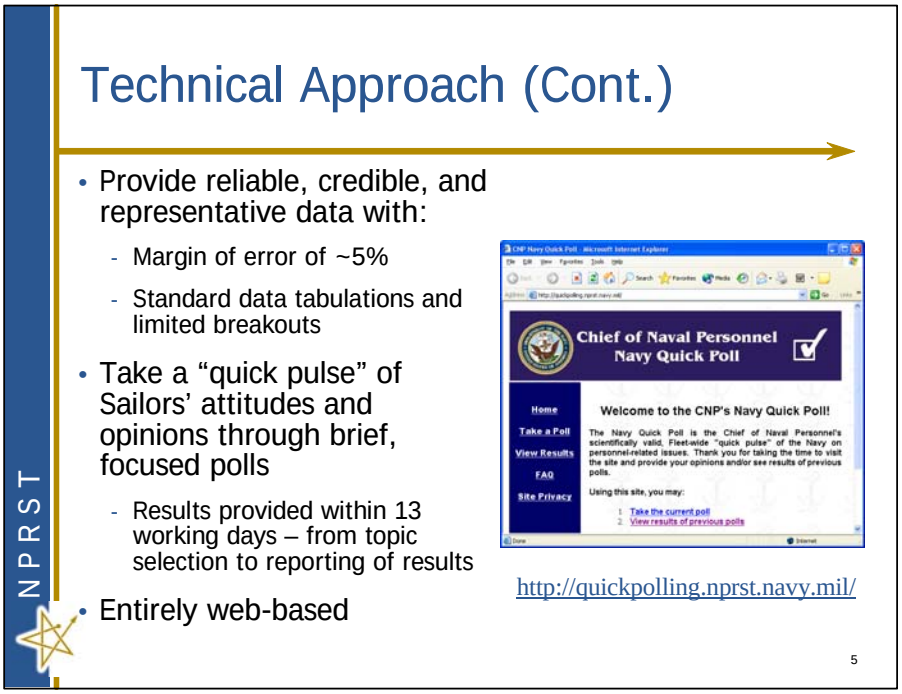
Navy Quick Polls

Navy Quick Polls: Rapid Feedback From the Fleet on Key Issues

Ms. Carol Newell (NPRST) began with a discussion of how Navy leadership has historically relied on large-scale surveys to assess Sailor attitudes and opinions regarding personnel-related issues, such as job satisfaction, quality of life, equal opportunity, and sexual harassment. She said that, while these efforts provide an in-depth analysis of the

issues, they generally are time-consuming, taking anywhere from 6 months to 1 year to complete. NPRST developed a unique Navy Quick Poll methodology to provide Navy leadership with scientifically accurate results of narrowly focused topics in less than 1 month.

Figure 11. Web-based Quick Poll technology[a]



a. Source: Ms. Carol Newell, *Navy Quick Polls: Rapid Feedback from the Fleet on Key Issues,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In this presentation, Ms. Newell described the Navy Quick Poll capability that allows quick, scientifically sound, web-based polls of Navy personnel. Quick polls have been conducted to date for polling on retention, communities, media/communications, and program evaluations. The Quick Poll technical approach is to select and contact the target population, deliver the polling instrument, and analyze the data. Quick poll, an entirely web-based approach, provides reliable, credible, and representative data with a 5-percent margin of error. Through brief but focused polls, a "quick pulse" is taken of Sailors'

attitudes, opinions, and beliefs. Results are provided within 13 working days.[1] Quick Poll offers Navy leadership a return on investment with rapid, accurate polls on personnel-related issues. It also provides "measures of success" or polling statistics.

Ms. Newell also presented the results of four recent polls that have been briefed to high-level Navy leaders and now have been publicly presented for the first time. These polls provided assessments on (1) operational risk management (ORM) and related safety issues in the Navy, (2) Sailor awareness, use, and satisfaction with a number of Navy initiatives and communication vehicles, (3) Sailor attitudes and opinions of Navy Core Values and ethical behavior, and (4) attitudes toward the Enlisted Education Requirement, as well as related education issues. Ms. Newell said that future Quick Polls will include a mechanism to rapidly poll reservists and civilians and incorporate both groups into Quick Polls.

Navy Quick Poll: Enlisted Education

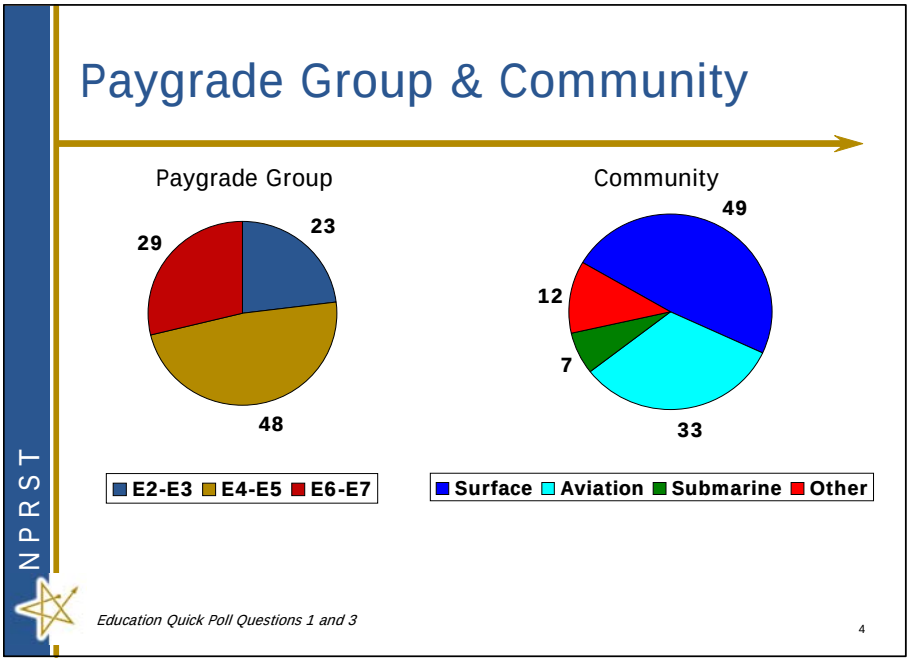
Ms. Zannette Uriell (NPRST) (PERS-1) presented the results of the Enlisted Education Quick Poll for the Enlisted Education Requirement (EER). Master Chief Petty Officer of the Navy Terry Scott is revisiting the current EER mandate that chiefs who want to make senior chief in 2010 must have an Associate degree. VADM Moran tasked NPRST to conduct a Quick Poll on EER and related enlisted education issues, targeting an expanded audience of Sailors from E2 to E7 for broader context.

The eligible sample included 6,109 Sailors with 1,933 returns for a response rate of 32 percent, a high rate of response for a Navy DoD-wide survey. The communities polled included surface, aviation, and submarine. Higher degrees were more common in senior paygrades. Following are some key poll responses. The submarine community was slightly less likely than other communities to have taken college courses. Among all paygrades and communities, few Sailors indicated that they were unable to complete college courses during Navy service. The most common barriers perceived are lack of time and the

1. See http://quickpolling.nprst.navy.mil/.

conflict between work and education, which was similar across all communities. The majority of Sailors in the E-6 to E-7 ranks plan to meet the EER, but the submarine community is least likely to believe EER is a good idea. Most of the respondents believe that EER would help them after they retire. The submarine community again was least likely to see the value added in EER. Less than one-third of E2–E3 and E4–E5, as well as Surface and Submarine communities, believe their sea/shore rotation allows them the opportunity to meet the EER. Poll respondents reported with high frequency (56 percent) that time/OPTEMPO is the main barrier to obtaining a college degree or equivalent as required to advance to Senior Chief. The barrier that ranked second is family responsibility. When asked what would make it easier to obtain a college degree, respondents ranked time off for classes in first place; flexible schedules was second.

Figure 12. Paygrade groups and community representation.[a]



a. Source: Mr. Geoffrey Patrissi, *Navy Quick Poll: Enlisted Education,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

2006 Navy Communications Quick Poll

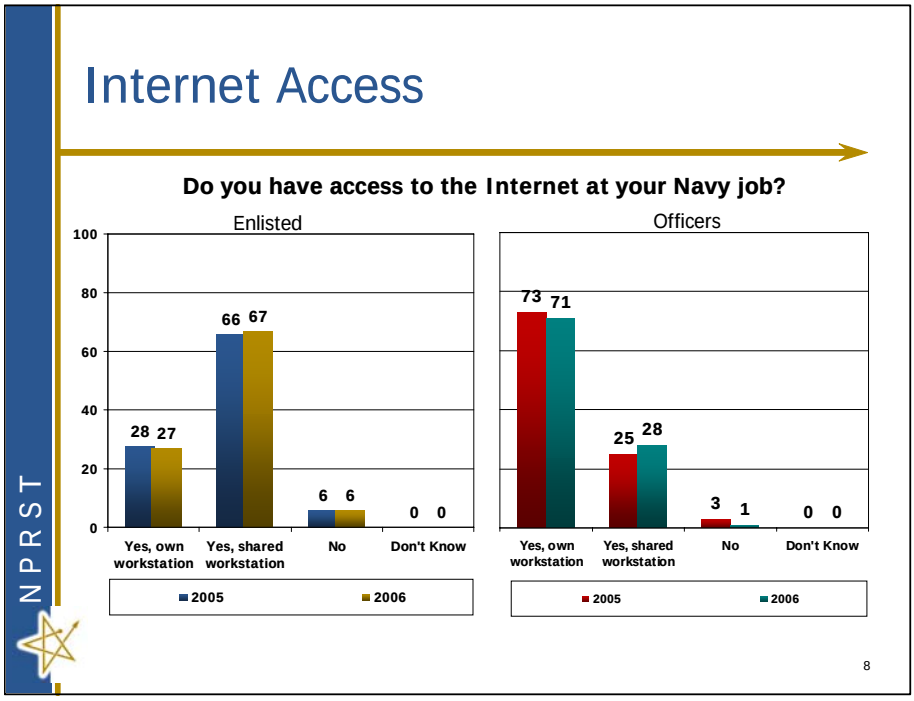
Ms. Carol Newell (NPRST) presented the results from a 2006 poll sponsored by the Center for Career Development (CCD) used to determine Sailor awareness, use, and satisfaction, with a number of Navy initiatives and communication vehicles. These awareness polls include satisfaction measures of Navy communications (e.g., internet access), voluntary education, Individual Augmentee (IA) assignments, and personnel management and communication. The poll of 2,459 out of 7,500 samples had a relatively high response rate of 33 percent, and results were compared with the 2005 poll, which had a response rate of 35 percent.

Ms. Newell discussed the results for enlisted and officers from the Personnel Management & Communications poll. The high scores for enlisted personnel (66 percent in 2006, 71 percent in 2005) suggest that the Navy is effective in promoting awareness of its diversity efforts. The lowest scores among enlisted personnel (41 percent in 2006, 38 percent in 2005) suggest that Sailors are not very confident that policies that affect the size of the Navy will be administered fairly and consistently. Officers likewise reported a high level of awareness of the Navy's diversity efforts—85 percent in 2006 and 77 percent in 2005. Again, their lowest scores (52 percent in 2006, 41 percent in 2005) were in the area of confidence that policies that affect the size of the Navy will be administered fairly and consistently.

Polls show that, in terms of Navy communications, internet access is highest for officers using their own workstations (71 percent in 2006, 73 percent in 2005) than for enlisted who rated access using shared workstations (67 percent in 2006, 66 percent in 2005). Officers more often said that they could access the web anytime they wanted (84 percent in 2006, 86 percent in 2005), compared with enlisted Sailors' web access as reported in 2006 (55 percent) and 2005 (60 percent). Navy officer and enlisted responses were similar on reports of time spent searching relevant websites to find career information—most reporting 16 to 30 minutes per day on the Navy Personnel Command (NPC) website—but officers tend to visit the site more regularly than enlisted. Both groups also gave similar levels of agreement that web-based, self-service initiatives are moving the Navy in the right

direction, with enlisted agreement declining in 2006 (58 percent) from 2005 (72 percent), while officer agreement also declined in 2006 (54 percent) from 2005 (77 percent). Enlisted Sailors were more likely than officers to report that the Navy provides enough information on the web for them to make informed career decisions. Navy Knowledge Online (NKO) was viewed and used more often by enlisted Sailors if there was enough time. Both officers and enlisted Sailors prefer face-to-face communication over all other forms of communication.

Figure 13. Differences in internet access between enlisted and officers[a]



a. Source: Ms. Carol Newell, *2006 Navy Communications Quick Poll,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In conclusion, Ms. Newell stated that overall, Navy personnel were positive about the communication received on personnel management issues. Half believe that the Navy clearly communicates its personnel goals and strategies, and close to two-thirds say that they

receive adequate information on the Navy's personnel policies. As for Navy communications, similar to the 2005 Communications Quick Poll, more than 90 percent of officers and enlisted polled have internet access, either at their own workstations or through shared workstations. Junior enlisted report less access than other pay groups. Approximately half of enlisted and 87 percent of officers have visited the NPC website. Enlisted are more likely to access the NKO website (74 percent), while officers are more likely to access the NPC website. Finally, Ms. Newell said that face-to-face communication (i.e., local command leadership (CO/XO, Dept. Head/LPO/LCPO, etc.) remains the top source of information about the Navy. IT communication vehicles (email, website, etc.) and printed publications also rated higher than radio or television.

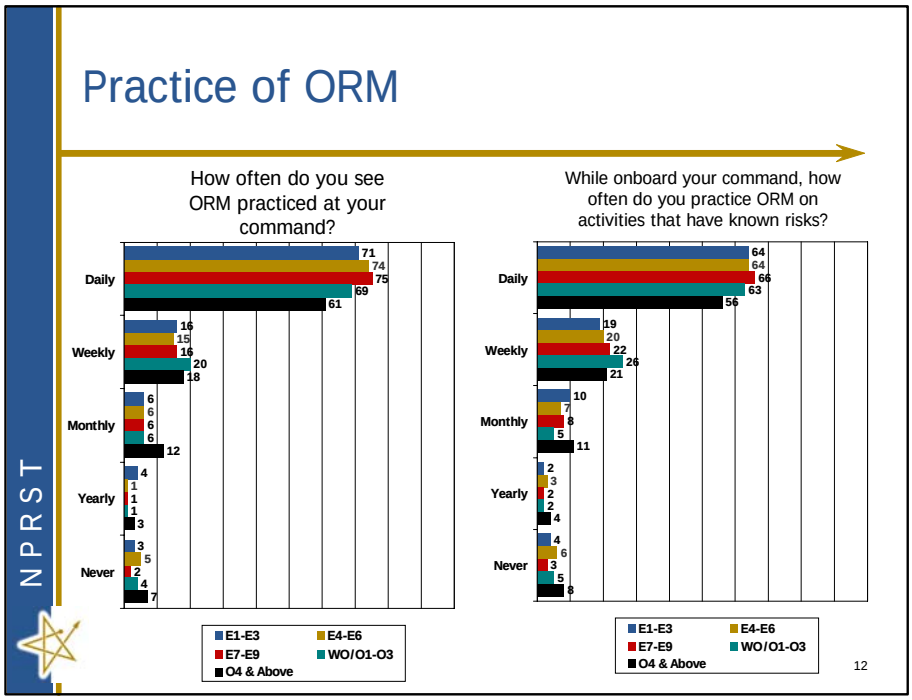
Operational Risk Management (ORM) Quick Poll

Dr. Kimberly Whittam (NPRST) (PERS-1) presented a study conducted for the VCNO and the Executive Safety Board who were interested in gaining a better understanding of how ORM is used in the Navy. The five-step process of ORM follows: (1) identify hazards, (2) assess hazard, (3) make risk decisions, (4) implement controls, and (5) supervise. The study team led by NPRST conducted a scientific Navy-wide Quick Poll focused on understanding four main issues: knowledge of ORM, practice of ORM, leadership support of ORM, and barriers to implementing ORM.

The 2006 poll was administered to a random sample of active-duty Navy personnel—both enlisted and officers. Respondents were given 6 days to complete the poll. There were 2,422 returns from a sample size of 7,456 for a response rate of 32 percent. (Typically, Navy-wide survey response rates are about 30 percent.) Over 97 percent of respondents had heard of ORM. Seventy-four percent of O4 respondents and 92 percent of E-4-E6 respondents had completed General Military Training (GMT) on ORM. Many others had received other training on ORM. In the two highest measures involving practice of ORM, between 85 percent (E1–E3) and 96 percent (E7–E9) from all ranks said they knew how to use ORM. Furthermore, between 83 percent (E1–E3) and 93 percent (E7–E9) stated that ORM makes a valuable contribution to the workplace safety of Navy personnel. Most

respondents reported that they see ORM practiced daily at their command. Respondents also report that incentives are not in place for those who use ORM in their commands and they don't know of any disciplinary consequences for not using ORM. The polls across all paygrades indicate that there is strong leadership support of ORM, and most report that they see leadership practice ORM at their command. The most significant barriers to ORM on duty, particularly for E1–E3 and E4–E6 ranks, according to the poll results are lack of incentives and lack of time to implement ORM. In addition, getting things done quickly appears to be more important according to these ranks.

Figure 14. ORM is being practiced across all command ranks[a]



a. Source: Dr. Kimberly Whittam, *Operational Risk Management (ORM) Quick Poll,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In conclusion, Dr. Whittam stated that knowledge is very high in terms of having heard about and having been trained in ORM. The low percentage of responses to the knowledge questions suggests that more quality training is needed. In terms of practicing ORM, attitudes and opinions are positive. Most respondents know how to use it and most feel that ORM makes a valuable contribution to workplace safety. Most respondents practice ORM daily on the job, even with very little incentive offered.

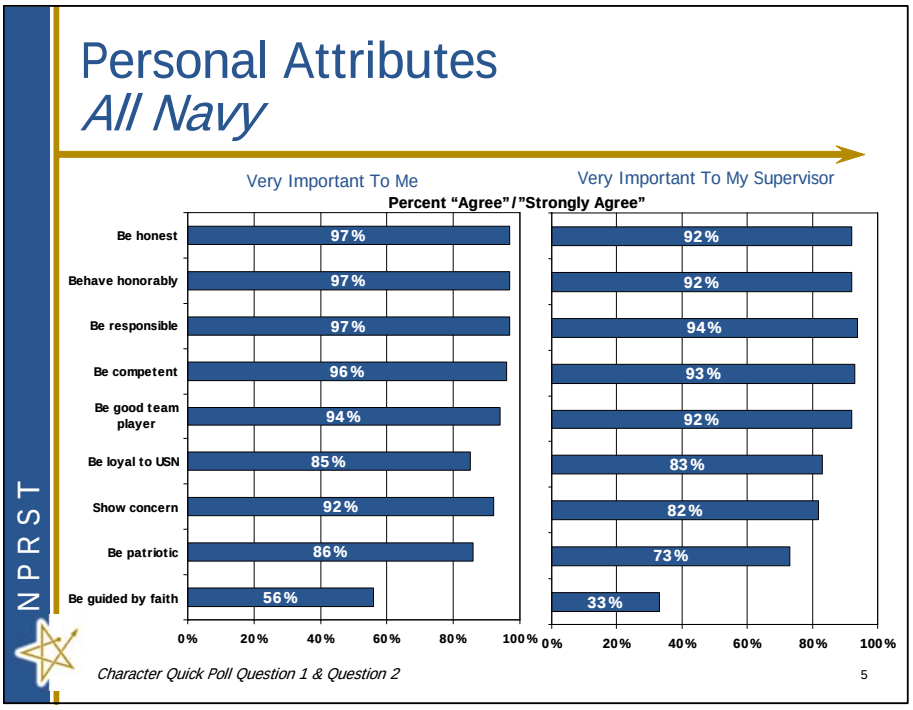
Quick Poll: Character

Ms. Zannette Uriell (NPRST) (PERS-1) presented the results of a study that set out to determine Sailor attitudes and opinions on Navy core values, ethical behavior, and character development. The 2006 poll was developed with sponsors or adapted from Navy/DoD surveys. A scientific random sample of Navy personnel was selected and stratified by paygrade groups. Commands were given 10 days to complete the poll. The eligible sample of 4,362 returned 1,582 surveys for a response rate of 36 percent, which is considerably higher than the DoD-wide web survey response rates for the Navy (28 to 29 percent).

In terms of personal attributes, Ms. Uriell's results show that honesty received the highest level of importance and this attribute was held to a higher standard by subordinates than it was thought to be expected of them by their supervisor. Other attributes that ranked high and were included in the poll were honorable behavior, responsible, competent, teamwork, loyalty, concern, patriotism, and faith. However, officers were more likely to respond that people in the command were honest, held accountable, and that core values are practiced by leaders. In terms of ethical behavior, polls rated the Navy at around 66 percent for dedication to ethical behavior, having leaders and CoC who "talk the talk" more than "walk the walk" (49 percent). Among the ranks, peers are rated lower in terms of talking and walking ethically. Officers tend to score each of the ethical categories more favorably. Although the percentages of those who report that they bend the rules to get the job done are low (30 to 33 percent), respondents report that it's okay to report friends and supervisors for wrong doing (68 to 80 percent). Furthermore, officers are less likely than enlisted ranks to report that they bend the rules to get the job done. In her

wrap-up, Ms. Uriell commented that character is defined as "a set of traits that governs an individual's reactions to environment and situations, which can be good or bad, and is revealed through behaviors and decision making." Most respondents believe that demonstrating good character makes the Navy better, but officers responded more favorably than enlisted personnel to this question. Both groups reported that having good character enables them to achieve goals in the Navy. With respect to Navy Core Values (NCV), most respondents report that it's important to understand how to consistently apply NCV. Both groups, but more officers, report that they apply NCV to their personal life.

Figure 15. Importance of personal attributes[a]



a. Source: Ms. Zannette Uriell, *Quick Poll: Character*, briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

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Research Presentations: Session II

Officer Education Issues

Navy Officer Careers: Developing the HR Profession

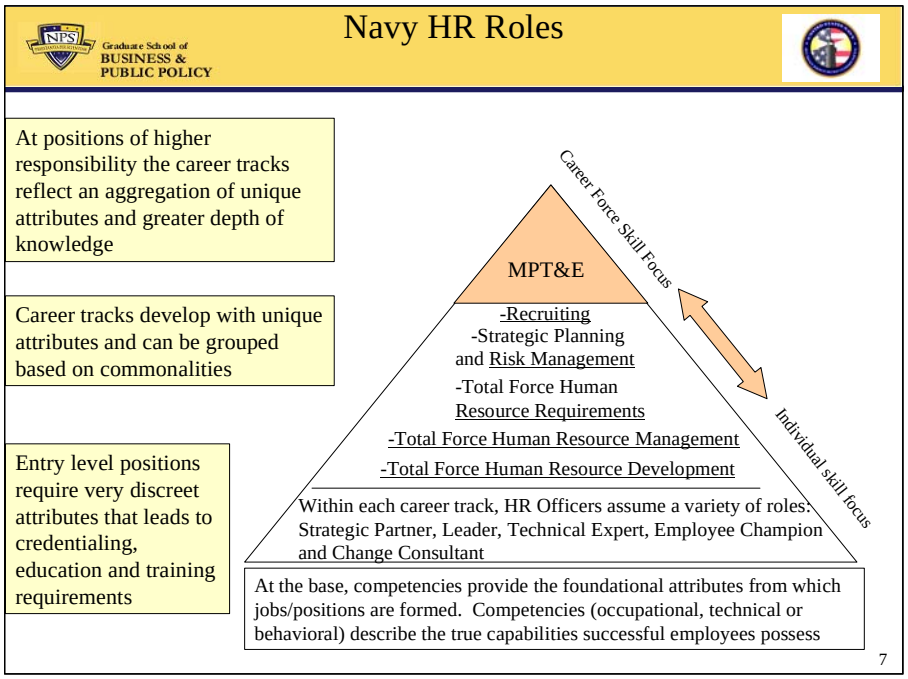
Mr. Robert Beck (Naval Postgraduate School (NPS)) discussed ongoing research of existing Navy professions in order to develop the HR profession. In his work, the initial focal points are career concepts, billet structure analysis (including commonality analysis of HR work), and the education and training continuum.

As an example of navigating a career and developing the skill sets, Mr. Beck described the path of supply corps officers. During the first 5 to 8 years, the goal is to develop fundamental competencies and leadership through a basic qualifications course, a sea/operational assignment, additional training ashore, and another sea/operational assignment. In the next 10 years, advanced technical proficiency and leadership is developed through advanced education, career track specialization, joint education/experience, O-5 Operational Tour, and tough, targeted, visible shore tours.

Mr. Beck explained that building strategic HR expertise by developing strategic talent means linking people decisions to organizational strategy. Human resource professional development is 70 percent strategic officer placement, 20 percent coaching/mentorship, and 10 percent education and training. The HR development strategy is to establish an optimal career path or target, identify and align MPT&E billets that support optimal career progression, eliminate or transfer billets not aligned but still important Navy work, and eliminate or civilianize work as applicable. Career tracks within the HR profession create unique expertise and provide opportunities for identifying and developing executive leadership.

Starting from a base of discrete attributes and competencies, the attributes lead to credentialing for jobs and positions.

Figure 16. Continuum of development for Navy HR professionals[a]



a. Source: Mr. Robert Beck, *Navy Officer Careers: Developing the HR Profession,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Next career tracks or paths lead HR officers to assume a variety of roles (e.g., strategic partner, leader, technical expert, employee champion, and change consultant). At higher positions of responsibility, career tracks reflect an aggregation of unique attributes and greater depth of knowledge.

According to Mr. Beck, future work in this area will involve surveying officers in the MPT&E domain to help develop critical career steps and subspecialty coding. The data will also be used to confirm/modify the HR career path build. The desired result is to understand where talent is critical to success, clarify data with civilians (private/

public/enlisted), gain a clear understanding of career tracks, and identify logical education/training insertion points.

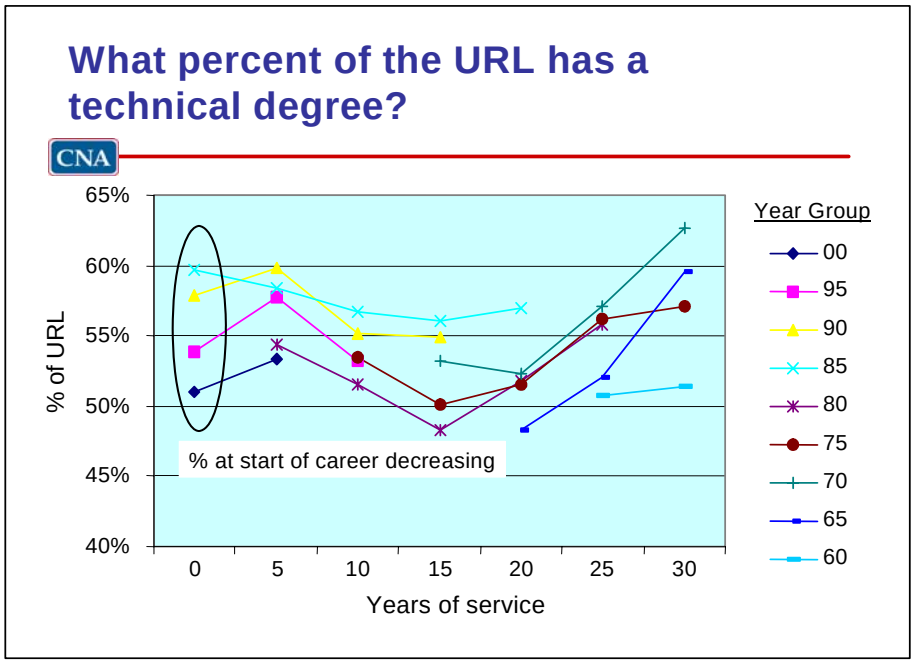
Officer Education Data

Dr. David Rodney (CNA) discussed various issues concerning the development of an education strategy for the Navy. Some of the topics include the importance of technical vs. nontechnical skill sets, graduate education, and joint qualifications. Research suggests that technical education is important. First, pipeline attrition is lower for tech majors. Also, a CNA study found that attrition is lower for USNA graduates, officers with high GPAs, and officers with high academic qualification rates, all of which are correlated. An NPS thesis that analyzed submarine JOs from USNA found lower attrition among tech majors and those with high GPAs on core technical curriculum.

Dr. Rodney presented graphical data on these issues. The data from 1997 through 2001 indicate that pilot pipeline attrition is lower for tech than nontech skill sets, and USNA and NROTC graduates had lower attrition than OCS graduates. The data also show that USNA graduates have significant technical education as revealed by higher core curriculum credits (average total credits = 145). Core curriculum credits earned for these graduates included engineering and weapons (20 credits), mathematics and science (31 credits), humanities and social sciences (24 credits), and professional/officer development (21 credits). NROTC has a smaller core curriculum as developed by each university.

Dr. Rodney also analyzed education statistics for Unrestricted Line (URL) graduates. He found that the percentage of URLs with technical degrees at the start of their careers has been decreasing since 1985. The data also show that there is higher training pipeline attrition for nontechs, and that shifts from URL to RL and civilian job opportunities are greater for tech grads. Among URLs, the percentage of tech grads increases sharply for senior officers. USNA order of merit (OOM) students with technical degrees rank in the top third, while nontechs are in the bottom third. Although the trend has been declining since 1988, communities in the top third of USNA OOM include Submariners, Pilots, SWOs, and NFOs—in descending order.

Figure 17. Technical degrees among URL officers[a]



a. Source: Dr. David Rodney, *Officer Education Data,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

According to Dr. Rodney, there are many questions about the graduate degrees among Navy officers. How many officers have graduate degrees? Does it vary by URL community? What are they studying? Where are they studying? Are graduates residents or nonresidents? Are there URL, RL and Staff differences? Does the NPS focus on the RL? How long does it take to get a Master's degree? First of all, he said that URL officers with graduate degrees have increased from 1990 through 2006. O-6s are followed by O-5s, O-4s, and O-3s. For the ranks of O-4 to O-6 with graduate degrees, SWOs are leading the way followed by Submariners, NFOs, and Pilots. Of the 6,816 URL officers who held graduate degrees in FY 06, two-thirds of the degrees were in social sciences. From 1981 through 2005, the number of graduate degrees held by URL residents is higher than for nonresidents. For the same time period, there have been more NPS graduates than NWC graduates. URL SWO residents and Submarine nonresidents lead the way for percentage of communities with graduate degrees. In

terms of graduate degrees as a percentage of strength, RLs are followed by URLs, then staff. Dr. Rodney's data for NPS graduates reveals that URLs have the highest percentage of graduates followed by RLs and then staff. The median for an NPS graduate to obtain a Master's degree is around 21 months.

Finally, Dr. Rodney presented his findings on questions about joint qualifications. How many URL officers have JPME I and JPME II? How many URL officers are JSOs?. The percentage of URL officers with JPME I have been steadily increasing since 1990 from about 3 percent of the total to just over 20 percent. For JPME II graduates, O4 and above, the percentage has increased from around 1 percent to about 13 percent. JSOs (O4+) as a percentage of URLs have declined since 1990 (over 16 percent) to 2006 levels of about 10 percent.

Analysis of the Return on Investment (ROI) on Navy Immediate Graduate Education Programs

Dr. Stephen L. Mehay (NPS) and Mr. William R. Bowman (USNA) discussed their analysis of the ROI for Navy graduate education. Graduate education options include funding for officers who attend as O3s (at NPS or civilian institutions) and the Immediate Graduate Education (IGE) program, an alternative that allows qualified newly commissioned ensigns to receive Master's degrees early in their careers. The policy issues surrounding these programs involve analysis of economic ROI on IGE programs, which is needed to guide Navy's strategic human capital decisions. Navy IGE programs include Voluntary Graduate Education Program (VGEP), the Scholarship Program, and the Immediate Graduate Education Program (IGEP). Annual participation is 12 for VGEP and 25 for the Scholarship Program. The Scholarship program participants seek mostly technical degrees, and the VGEP program is balanced between technical and nontechnical degrees. Technical degrees are trending downward in both programs.

In this study Dr. Mehay's team identified and measured the economic benefits to the Navy of providing early advanced education to officers and developed a case study of the ROI of the early graduate education program. Analysts apply accepted economic principles and

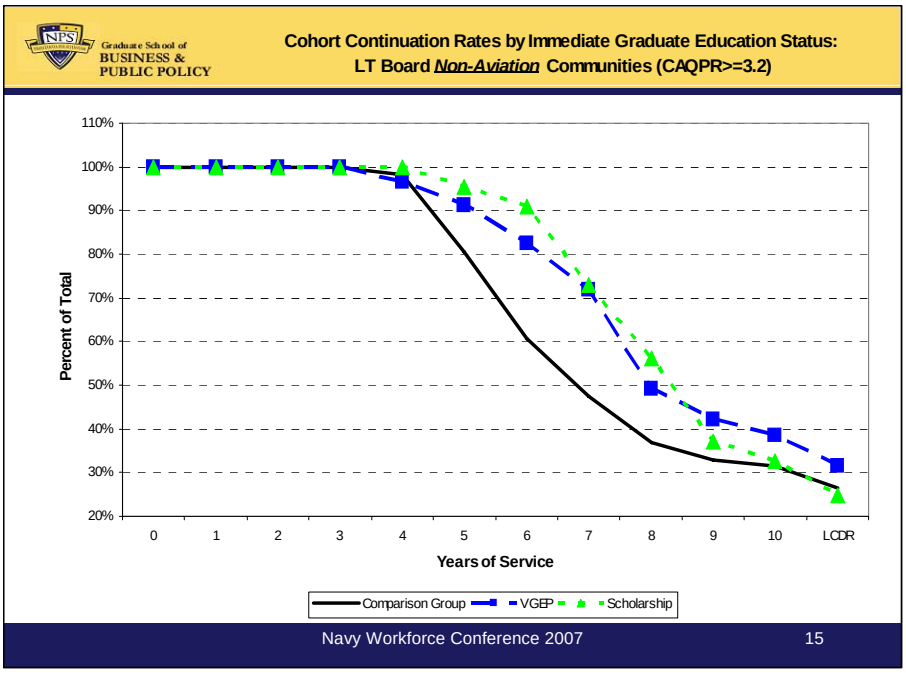
statistical techniques to assess the value of early graduate education to the Navy. Dr. Mehay explained that economic return to education is based on salary differentials in the civilian labor market. He said that the ROI to Master's degrees is 7 to 20 percent higher for technical Master's degrees and MBAs. Research shows that there are potential effects and benefits for the Navy, such as higher retention due to the additional obligation or to an increased propensity to stay. There is also a monetary benefit since officer accessions and commissioning costs are reduced. However, there may also be lower retention due to increased employability in civilian jobs. Another benefit for the employer is job productivity resulting in increased individual or unit performance and monetary benefit because of reduced manpower requirements. Further benefits include quality of life, job satisfaction, and satisfaction with Navy.

Dr. Mehay's team estimates ROI based on measurable retention effects focusing on the primary issue: What is the effect of IGE on retention? The data sources include data on USNA graduates from 1983 to 1998. Information on VGEP and Scholarship participants was provided by USNA Graduate Education Program Office, and information on all USNA graduates obtained from USNA Office of Institutional Research. Separation data from Navy Officer Loss Files were also useful. The team estimated retention effects statistically using the differences in retention between "experimental" groups (IGE participants) and a "control" group (nonparticipants). Some alternative control groups were also used. The team clarified the retention goals of the program and then analyzed retention at several career points to test the sensitivity of estimated retention benefits.

The team used actual program size to simulate flows of officers to the selected career points and compared cohort continuation rates (CR) for the experimental groups (VGEP, Scholarship, and control). Benefits were based on differences in accessions and in the associated precommissioning costs, and benefit-cost ratios were computed. Final analysis was done using multivariate retention models. Dr. Mehay's team found that for URL (non-Aviators), VGEP participants were significantly more likely to stay to 9 years of commissioned service (YCS) (+17 points or 30 percent higher retention); and more likely stay to 10 YCS (+14 points higher retention). Scholarship participants

showed no significant difference in retention. Aviators participating in VGEP were more likely to stay to 10 YCS (+21 points). Scholarship participants showed no significant differences in retention but were more likely to promote to O4 (+20 points). Retention rates for IGE participants—both VGEP and Scholarship—are either higher than or the same as the comparison group. They did not find lower retention for IGE participants.

Figure 18. Continuation rates by IGE status for non-Aviation cohorts[a]



a. Source: Dr. Stephen L. Mehay, *Analysis of the Return on Investment (ROI) on Navy Immediate Graduate Education Programs,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Mehay's team concluded that VGEP ROI is positive under all scenarios. Since this analysis incorporates only retention benefits, incorporating other benefits would only increase the ROI. Dr. Mehay stated that, although scholarship is a more costly program, its true benefits are understated in the study. Their assessment is that the value of Scholarship Program to Aviators, plus other unmeasured

benefits, warrants program continuation. For Aviators, because of restricted career paths, IGE may be the only way to deliver graduate education to this group. Current obligations for both programs are served concurrently, and they would not recommend changing the obligation.

Current and Future Manpower Initiatives

Enterprise Simulation and Optimization Laboratory (eSOL)

Dr. Mehdi Amini and the team of researchers from enterprise Simulation and Optimization Laboratory (eSOL) and NPRST began the presentation by stating that recent studies show that the traditional supply chain paradigm can benefit the Navy Manpower and Personnel Supply Chain (NMPSC). Dr. Amini said that the migration path introduces challenges and improvement opportunities and that the key challenge is the "human entity." Dr. Amini discussed the characteristics of the traditional supply chain versus the NMPSC . The traditional supply chain is responsible for sourcing, manufacturing, distribution, and return/service of goods and products to satisfy the needs of end customers at the expected cost, quality, and time. The NMPSC is responsible for recruiting, training, distribution, and retention/promotion of personnel to satisfy the needs of command centers at the expected cost, quality, and time.

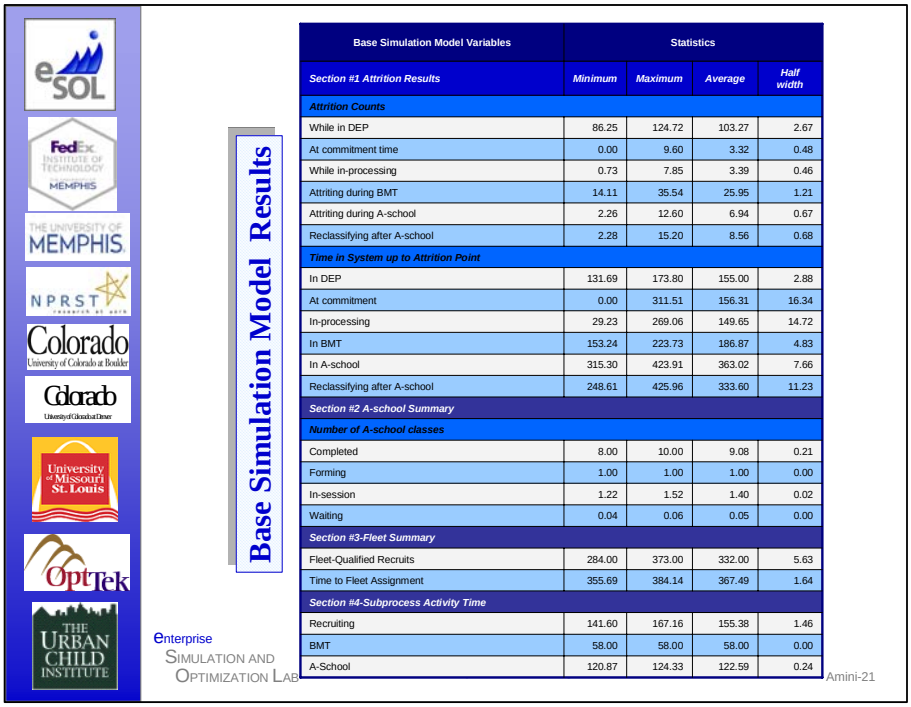
In a simulation modeling exercise of the "Street-to-Fleet" supply chain for the Builder Community, the base and scenario simulation models included the integrated street-to-fleet processes of recruiting, BMT, A-School, and fleet assignment. The planning component is excluded, modeling only recruit flow. Research steps included value-stream mapping, which developed, validated, analyzed, drew conclusions about, and identified potential improvement opportunities. Data matrices were developed and collected from a host of data sources, and data were validated and analyzed. The base and "what if" scenario simulation models designed, verified, validated, and confirmed the assumption outcomes. Production runs were completed and outcomes analyzed.

Dr. Amini said that the current simulation model is capable of tactical what-if analyses involving fleet-qualified goals, recruiting targets, A-School structure (i.e., capacity, content, length and class size) and response to demand signals. It can also perform tactical what-if analyses for attrition and supply chain performance measurements applied (i.e., frequencies, and time). The study simulated three scenarios. The first scenario studied the impact of inaccurate demand planning with an increased recruiting rate of 10 percent. The second scenario studied the impact of modifications in A-School structure, increasing class size to 50 and decreasing it to 30. The third scenario studied the impact of responses to fluctuating demand signals involving an increased recruiting rate to 20 percent for 6 months, followed by the base recruiting rate.

Dr. Amini's results for scenario 1 revealed an increase in variability in the performance measurements, times, and frequencies. Average times stayed the same, and there was an increase in frequencies. Scenario 2-U results for class size increased to 50, which indicated an increase in recruits reporting time to fleet and an increase in time to attrition. Scenario 2-D results for class size decreased to 30, which revealed a slight decrease in recruits reporting time to fleet and a decrease in time to attrition. Scenario 3 results for increased recruiting rate to 20 percent for 6 months, followed by base recruiting rate, observed a supply chain response lag to the change in demand signal and recruit oversupply.

In conclusion, Dr. Amini said that value-stream mapping is a feasible and effective approach for the Navy Manpower and Personnel Supply Chain visualization. The value-stream mapping technique may be readily applied to supply chains of other communities or job families. Furthermore, Dr. Amini said that simulation modeling is a powerful approach for NMPSC visualization and analysis, for understanding the dynamic and complex as-is behavior of the supply chain, and conducting what-if scenario analyses.

Figure 19. Base simulation model variables and statistics[a]



Base Simulation Model Variables	Statistics			
Section #1 Attrition Results	***Minimum***	***Maximum***	***Average***	***Half width***
Attrition Counts				
While in DEP	86.25	124.72	103.27	2.67
At commitment time	0.00	9.60	3.32	0.48
While in-processing	0.73	7.85	3.39	0.46
Attriting during BMT	14.11	35.54	25.95	1.21
Attriting during A-school	2.26	12.60	6.94	0.67
Reclassifying after A-school	2.28	15.20	8.56	0.68
Time in System up to Attrition Point				
In DEP	131.69	173.80	155.00	2.88
At commitment	0.00	311.51	156.31	16.34
In-processing	29.23	269.06	149.65	14.72
In BMT	153.24	223.73	186.87	4.83
In A-school	315.30	423.91	363.02	7.66
Reclassifying after A-school	248.61	425.96	333.60	11.23
Section #2 A-school Summary				
Number of A-school classes				
Completed	8.00	10.00	9.08	0.21
Forming	1.00	1.00	1.00	0.00
In-session	1.22	1.52	1.40	0.02
Waiting	0.04	0.06	0.05	0.00
Section #3-Fleet Summary				
Fleet-Qualified Recruits	284.00	373.00	332.00	5.63
Time to Fleet Assignment	355.69	384.14	367.49	1.64
Section #4-Subprocess Activity Time				
Recruiting	141.60	167.16	155.38	1.46
BMT	58.00	58.00	58.00	0.00
A-School	120.87	124.33	122.59	0.24

a. Dr. Mehdi Amini et al., *Simulation Modeling and Analysis of Street-to-Fleet Supply Chain: The Builder Community,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Future: Force Utilization through Unit Readiness and Efficiency

Mr. David Cashbaugh (NPRST) and Dr. Tanja Blackstone (NPRST) discussed the various perspectives, goals, barriers, and recommendations for future unit readiness and efficiency. They began their presentation with a quotation from the U.S. Commission on National Security: "change in military personnel policies in the recruitment, promotion, compensation, and retirement systems is based on a belief that the current systems do not fit contemporary realities." In addition, the Defense Science Board (DSB), OSD Morale & Quality of Life Review, and N1 also called attention to similar factors in need of restructuring.

Mr. Cashbaugh and Dr. Blackstone discussed many of the potential barriers to success and ways to overcome them. Barriers include an

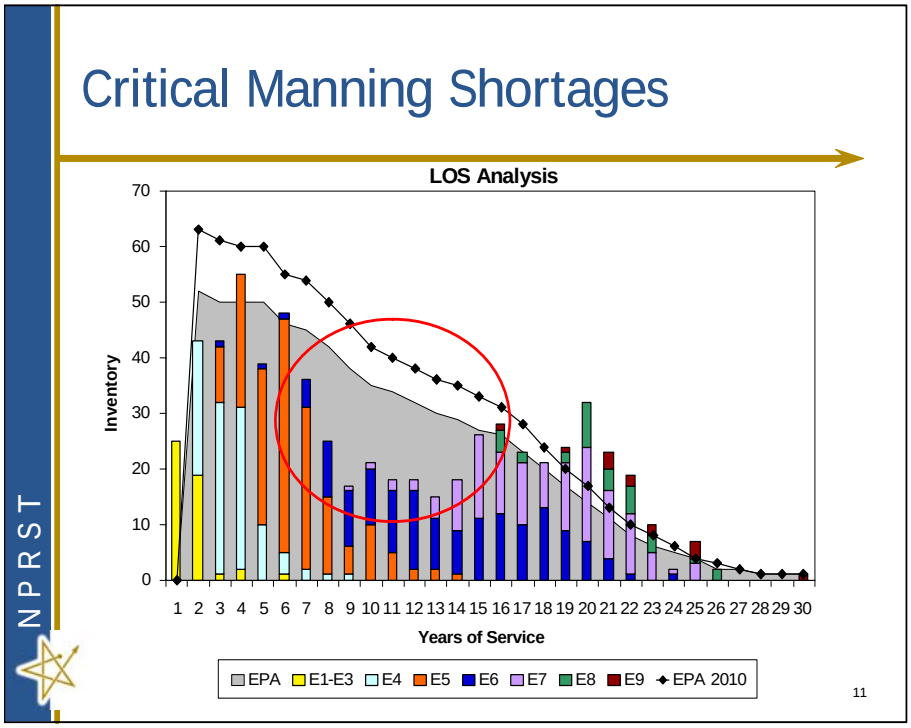
inflexible requirements determination system, limited lateral entry, a "cliff-vesting" retirement system, up-or-out career management, a disjointed approach to compensation, and restricted career/assignment choice. They suggest that barriers might be overcome by COs empowered to manage manpower/personnel, career "on and off ramps," promotion to position, pay for performance, market-based incentives, and Sailors with negotiation power over career and assignments. Furthermore, they believe that unit-level personnel management (e.g., visibility over potential labor pool and flexible contracts) and unit-level cost management (e.g., operating costs and incentives) would enhance readiness and efficiency. At the Total Force level, such things as flexible career paths, total visibility over potential jobs/salaries and flexible contracts to meet individual needs would enhance readiness and efficiency.

Mr. Cashbaugh and Dr. Blackstone provided data on sea and shore billets versus inventory. Some ratings had inventory-to-billet ratios as high as 800 percent and as low as 55 percent. The data also show critical manning shortages traced to YOS 6 through 16. To balance out such inefficiencies, strategies are needed that will allow the Navy to attract, train, develop, equip, and motivate the right talent at lower cost. Among other possible solutions, new technological deliverables are being considered that include such concepts as metrics for optimal active/reserve/civilian integration or substitution, flexibility to accomplish personnel distribution and assignment at or below the platform/command level, allocation of resources across commands competing for the same human capabilities, ability of current metrics to support future human capital situational awareness, tools to evaluate resource allocation across stakeholders, and alternative incentive structures.

Mr. Cashbaugh and Dr. Blackstone submit that cost efficiencies can be achieved when resource allocation resides with decision-makers who are responsible for mission execution. According to Mr. Cashbaugh and Dr. Blackstone, two key barriers exist in the DoN: an organizational culture of centralization and complexity of decentralized decision-making. They believe that future strategies will need to rely on behavioral economics, which incorporates psychological metrics into classic economic theory. Future strategies will also need to rely

on agent-based and hybrid artificial intelligence to simulate individual decision-making in a complex system. Furthermore, modeling and simulation will produce visible results of complex decisions about components such as compensation, career paths, and resource allocations. Finally, optimization will be used to maximize or minimize objective functions with discrete or continuous variables subject to multiple constraints over very large parameter spaces. Mr. Cashbaugh and Dr. Blackstone believe that future challenges to better strategies will include the lack of a guiding Total Force Management plan, lack of understanding or tools for individual workforce segments, lack of Total Force enterprise metrics, and difficulties in maintaining workforce quality.

Figure 20. Inventory of manning by years of service and paygrade[a]



a. Source: Mr. David Cashbaugh and Dr. Tanja Blackstone, *Future: Force Utilization through Unit Readiness and Efficiency,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

NCAPS and SYRUS: Personality and Adaptability in Multitasking Environments

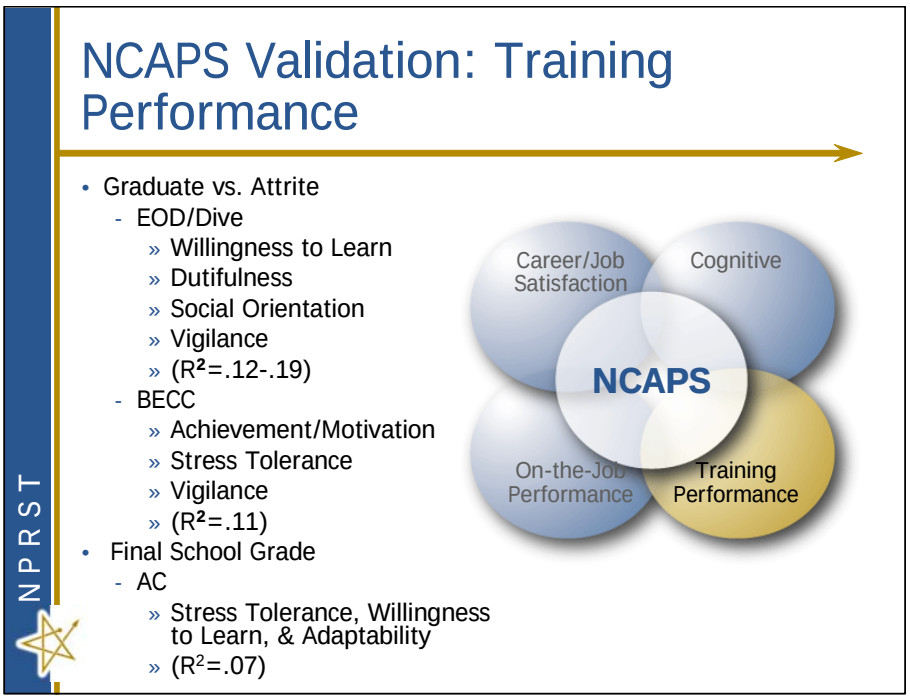
Dr. L. Andrew Jones (NPRST) and Dr. Frederick L. Oswald (Michigan State University) discussed the benefits of personality and multitasking in whole person assessment. They propose that combining the Armed Services Vocational Aptitude Battery (ASVAB), Navy Computer Adaptive Personality Scales (NCAPS), and SYRUS provides better classification and improved person-job fit. Furthermore, combined assessments lead to increased job performance, decreases in unwanted attrition, and enhanced job/career satisfaction. NCAPS is an innovative web-enabled, computer-based tool that is scored instantly and easy to administer. It measures traits that are typically required for success in most Navy jobs, such as leadership orientation, dutifulness/integrity, adaptability/flexibility, stress tolerance and achievement.

According to Dr. Jones and Dr. Oswald, NCAPS is being validated for use as a Navy-wide classification tool. NCAPS can provide predictive validation through longitudinal data from tests early in training and tracked into the fleet. The tool can also validate training performance and on-the-job performance. In addition, multitasking (MT) ability and adaptability can be measured as a predictor of job performance, along with other predictors such as cognitive ability, personality, and motivation. Performance criteria are set using behaviorally anchored rating scales (BARS) based on supervisor and peer ratings. SYRUS testing variables are also incorporated. These include cognitive measures (e.g., AFQT, SAT, or ACT), demographic variables (e.g., sex, age, race), noncognitive traits (e.g., adaptability, anxiety, perceived workload), and physiological variables (e.g., heart rate, blood pressure).

Dr. Jones and Dr. Oswald discussed some of the measures that are possible when combining NCAPS and SYRUS. Task strategies are measured by transition probabilities (TPs), which calculate the probability that individuals move from one task to another or stay on the same task. Correlations of emergency TPs with emergency scores can be done using elements of memory, math operations, visual monitoring, and auditory response. Hierarchical Linear Modeling (HLM)

is used to model MT performance over time to predict initial levels of MT performance and improvement over time under baseline and emergency (fast paced) conditions. Dr. Jones said that simultaneous SYRUS and NCAPS testing was performed for the first time in March 2007 and will be expanded to fleet concentration areas in the future.

Figure 21. NCAPS is used to validate various predictors of job performance[a]



a. Source: Dr. L. Andrew Jones and Dr. Frederick L. Oswald, *NCAPS and SYRUS: Personality and Adaptability in Multitasking Environments,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Personnel Integration of Selection, Classification, Evaluations, and Surveys: PISCES

Dr. Jacqueline A. Mottern (NPRST) opened the presentation stating that the CNO's "Strategy for Our People" of 7 February 2006 involves building a competency-based, capabilities-driven, mission-ready Total Force. However, Dr. Mottern stresses that much of what is needed (in

terms of technology infrastructure, business processes, and knowledge) to support this vision doesn't exist. According to Dr. Mottern, the Navy's selection, classification, and assessment enterprise currently entails individual selection, classification, and assessment metrics involving the individual Sailor, and it uses single-use assessments. The objective of PISCES is to transform the system to operate at the team level, to include Total Force assessment metrics, both at the individual and team level, and to integrated career-long assessments. Dr. Mottern believes that the integrated tools will allow for increased human resource flexibility while significantly lowering costs.

Dr. Mottern's scientific approach to PISCES involves three components: the integrated assessment system, team selection and assessment, and modeling and simulation environment.

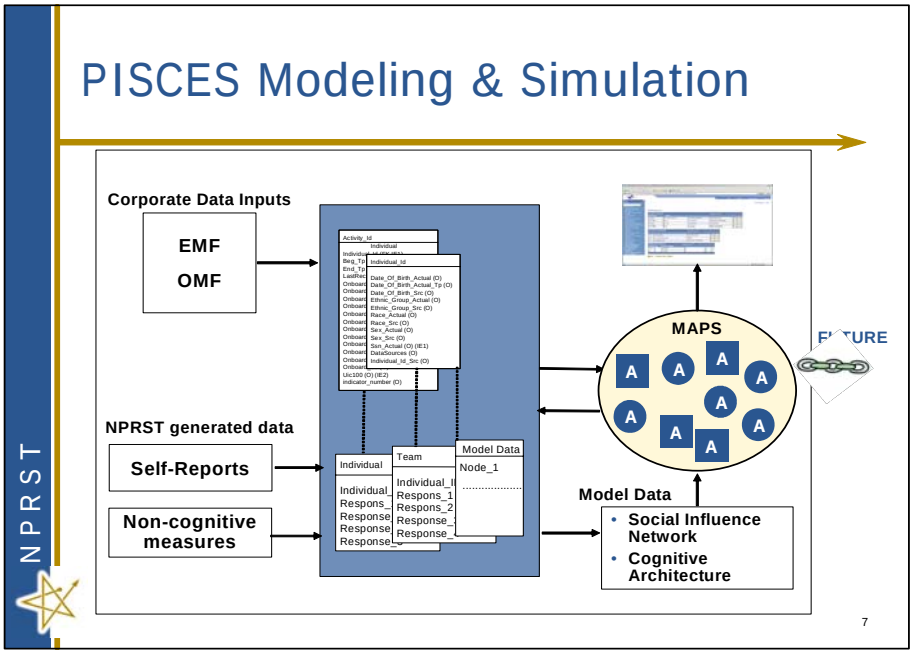
First, the integrated assessment system improves on current assessments by identifying characteristics that influence key Navy outcomes (performance and retention) through new assessments, such as selection and classification, attitudinal, behavioral outcomes across the career span for individuals, integrated assessments across the Total Force, and leveraging of existing measures and past research. Next a suite of data collection tools will be developed to most effectively and efficiently query the Total Force. Finally, models related to performance and retention outcomes will be developed and validated.

Second, the team selection and assessment tools will be developed to allow members of Navy teams to be selected based on team competencies and non-cognitive traits (e.g., adaptability, stress tolerance, and multi-tasking ability). Next, valid team competency-based performance measures will be developed. Finally, an experimental team simulation that assesses performance of teams in virtual and realistic simulations will be developed.

The third component involves a modeling and simulation environment in which Total Force members experience a myriad of cognitive, non-cognitive, and situational measures. It uses a multi-agent simulation system to simulate forecast behavior at team and individual levels.

Dr. Mottern concluded by discussing the contributions of PISCES to science and technology. First, integrated career span assessments will lead to better behavioral prediction across the Total Force. This is accomplished through integrating alternative personnel resources (active duty, reserve, and civilian). Second, team selection, classification, and assessment tools match teams to missions and individuals to teams. Finally, the personnel simulator is used to assess performance of teams in virtual and realistic situations.

Figure 22. PISCES simulates a forecast of individual and team-level behavior[a]



a. Source: Dr. Jacqueline A. Mottern, *Personnel Integration of Selection, Classification, Evaluations & Surveys: PISCES,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Reserve Issues

The Effect of Deployment Tempo on Marine Corps' Selected Reserve (SelRes) Retention

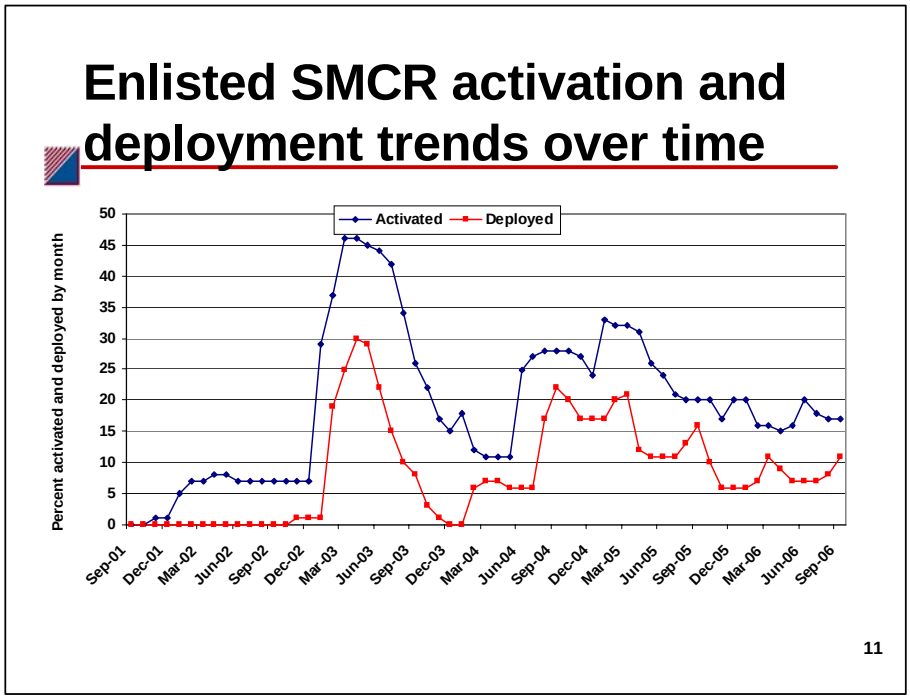
Dr. Michelle Dolfini-Reed (CNA) and her research team studied the effect of ongoing mobilization on the rate of SelRes attrition. Activation and deployment patterns were tracked since September 2001. Monthly snapshots of data were extracted from the Reserve Component Common Personnel Data system (RCCPDS) for August 2001 through June 2006, and the Contingency Tracking System (CTS) for September 2001 through 2006. The team analyzed activation and deployment patterns of enlisted and officers of the Army National Guard (ARNG), U.S. Army Reserve (USAR), Air National Guard (ANG), Air Force Reserve (AFR), U.S. Marine Corps Reserve (USMCR), and U.S. Navy Reserve (USNR).

The study team's analyses revealed the following. *Enlisted* activations, both complete and current, were highest in number for the ARNG and the USAR, respectively. Enlisted activations and deployments increased through mid-2005 with signs of a decreasing trend since then. Overall, three out of five completed enlisted activation deployed. In addition, more than two-thirds of ongoing enlisted activations were deployed. *Officer* activations, both complete and current, were highest for the USAR and the ARNG, respectively. Officer activations and deployments also increased through mid-2005, with signs of a decreasing trend since then. Again, three out of five officers who have been activated also have deployed. Dr. Dolfini-Reed summarized these observations stating that, as of June 2006, over half a million SelRes members had been activated. The ARNG and the USAR had the greatest number of their SelRes activated, and the USMC had the greatest relative percentage activated. Activation lengths tended to last 6 months or less for members of the ANG/AFR, for 7 to 12 months for members of the USMCR/USNR, and for 13 to 24 months for activated members of the ARNG/USAR. She said that the percentage deployed has increased over time.

Dr. Dolfini-Reed also discussed modeling challenges, their modeling approach, and their survival analysis results. First, the dynamic nature

of the ongoing reserve mobilization means that each month reservists potentially will be changing their status—for example, from never activated to activated, from recently deactivated to activated, or from never activated to a loss. In addition, those currently activated are under stop-loss and not able to leave the Reserves, which will tend to upwardly bias retention rates. Defining the comparison group presented another issue, and data integrity issues complicated the reliability of defining deployment status. The study team used survival analysis to model the probability that a particular person will leave the SelRes given that others at potential risk have remained. In their work, they estimated SelRes losses as a function of four general types of variables: mobilization factors, military characteristics, individual characteristics, and economic factors. Models were estimated for each reserve component, with separate models for junior enlisted, senior enlisted, and officers.

Figure 23. Differences in activation and deployment trends for enlisted personnel[a]



a. Source: Dr. Michelle Dolfini-Reed et al., *The Effect of Deployment Tempo on Marine Corps' Selected Reserve Retention,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

The research teams' model of mobilization characteristics produced the following results with respect to activation status, deployment status, length of active duty period and OIF period. Junior, senior enlisted, and officer SelRes are less likely to leave compared with those not yet activated, across all reserve components. For all three groups, reservists whose activation included a deployment were less likely to leave, although this was not the case for the USMCR. Similarly for all groups, risk of loss tends to decrease as the length of the active duty period increases in the ARNG, USAR, USMCR, and USNR. ANG and AFR risk of loss tends to increase as their length of active duty period increases. Also, the relative risk of loss is lower for all reserve components since OIF began, except for the junior enlisted USMCR, which has a relatively higher risk of loss. Dr. Dolfini-Reed concluded that, from a retention perspective, if you are going to activate reservists, it is better to deploy them. She also said that results for the OIF period seem to indicate that reservists are experiencing a reset in their expectations. Finally, service-specific organization and culture are important factors to consider when examining reserve retention behavior.

Modeling How Activation Rules Affect Accession and Continuation in the Guard and Reserve

Dr. Colin Doyle (IDA) discussed how attitudes and expectations about active duty service and activation rules affect Guard and Reserve accessions. Dr. Doyle described a research model intended to predict how different activation rules alter the accession and retention performance of the reserve components, and how compensation options could offset these consequences. Dr. Doyle's model is an extension of the Dynamic Retention Model of Gotz and McCall (1984). The baseline period in which the first set of expectations was in place is from 2001 through 2004.

Dr. Doyle's research assumes that decisions to join, and to stay in, the reserve component are affected by three factors. First, reservists value money income. Second, they assign a positive or negative money valuation to a day on active duty. Third, random events also affect decisions that may be expressed in dollar terms (e.g., spousal illness). Dr. Doyle explained that when added together these factors give a

total measure of "utility" or "well-being." Ultimately, the reservist will choose to stay or leave (join or not) by comparing the discounted values of utility over his/her life from each option.

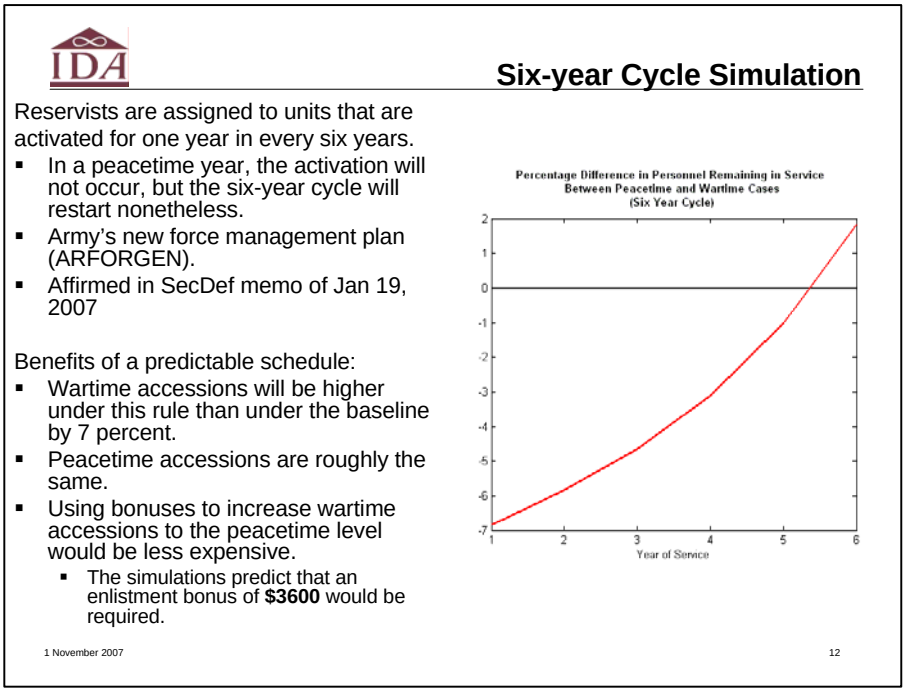
According to Dr. Doyle's research, another important factor is expectation. Reservists do not know with certainty whether next year will be wartime or peacetime, or whether they will be activated next year. They do know however, the probabilities of these events. Reservists may expect wartime activation rates to be similar to those of the current Global War on Terror era.

Dr. Doyle's said that his data cover all members with no prior military service who enlisted in the Army Reserve and Army National Guard from 1997 through 2004. Data include the choices made by 339,078 individual soldiers in each year, and their activations, and were provided by the Defense Manpower Data Center. The model estimation's key parameters describe the distribution of the desire for active duty among the population and the distribution of the random events. A particular set of parameters generates a particular set of probable accession and continuation choices. Furthermore, the researchers estimated these parameters by maximizing the "fit" between these predicted choices and the actual choices in the data. The baseline simulation uses estimated model parameters to simulate a long period of peacetime followed by 6 years of wartime.

Dr. Doyle's results show that accession falls because some people with a lower taste for active duty do not join in wartime. Accession falls in wartime by about 12 percent. The continuation rate is increased by 1.4 percentage points in the first year of service, rising to 3.4 percentage points in the sixth year. As a result, strength (number of personnel) in the sixth year of service is 3 percent higher. Continuation rises because the wartime accessions have a higher average taste for active duty. Dr. Doyle explained that the opportunity for active duty in wartime also raises the continuation of those serving members who have a strong taste for active duty. Additional simulation suggests that an initial service obligation bonus of $6,900 (six $1,150 installments) would equate wartime accessions to their peacetime level. Reservists in a 6-year cycle are assigned to units that are activated for 1 year in every 6. Peacetime accessions don't change, but wartime accessions

will be higher under this rule than under the baseline by 7 percent. Reserve and guard units in a 4-year cycle are activated 1 year in every 4. Wartime accessions will be lower under this rule than under the 6-year rule by 5 percent. The higher frequency of active duty encourages reservists with a taste for active duty to stay.

Figure 24. Benefits of a 6-year predictable schedule[a]



a. Source: Dr. Colin Doyle, *Modeling How Activation Rules Affect Accession and Continuation in the Guard and Reserve,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In conclusion, Dr. Doyle stated that future work will update estimations adding 2005 and 2006 data to account for potentially different expectations. He will also develop an estimate model for other reserve components and a model for prior-service accessions. Finally, he will disaggregate the model to look at high-demand/low-density occupations.

Requirements

Billet Analysis Tool

Mr. Steven Belcher presented preliminary findings from a CNA research effort that is examining the sourcing and selection process that the Navy uses to fill Individual Augmentation (IA) requirements. Manpower augmentation represents unfunded, unplanned, but necessary allotments of Navy personnel to augment existing units and organizations so that Navy and Combatant Commanders can effectively perform their assigned missions. Active duty Sailors and officers who are pulled from their current commands and sent on Temporary Additional Duty (TAD) orders to fill these requirements are known as Individual Augmentees (IAs).

Mr. Belcher presented statistics on the number and location of IA assignments and on the characteristics (e.g., rating/designator and paygrade) of servicemembers who were selected to fill these assignments. The number of IA assignments increased dramatically from 2003 to 2006, with most IAs deploying to the CENTCOM AOR. Midgrade enlisted personnel (E-5 and E-6) and officers (O-3 and O-4) filled the majority of these assignments. On the enlisted side, servicemembers in the MA, IT, and HM ratings filled about half of all IA assignments. For officers, Unrestricted Line officers filled the greatest percentage, followed by staff corps officers.

According to Mr. Belcher, the process through which the Navy responds to manpower augmentation requests and selects individuals to fill approved assignments has evolved over the past few years. The current IA sourcing process consists of two main phases: a sourcing assessment phase and a sourcing execution phase. In the sourcing assessment phase, the Navy evaluates incoming requests and develops a response. In the sourcing execution phase, the Navy responds to official tasking (based on the results of the assessment phase) and selects individuals (or units) to fill requirements.

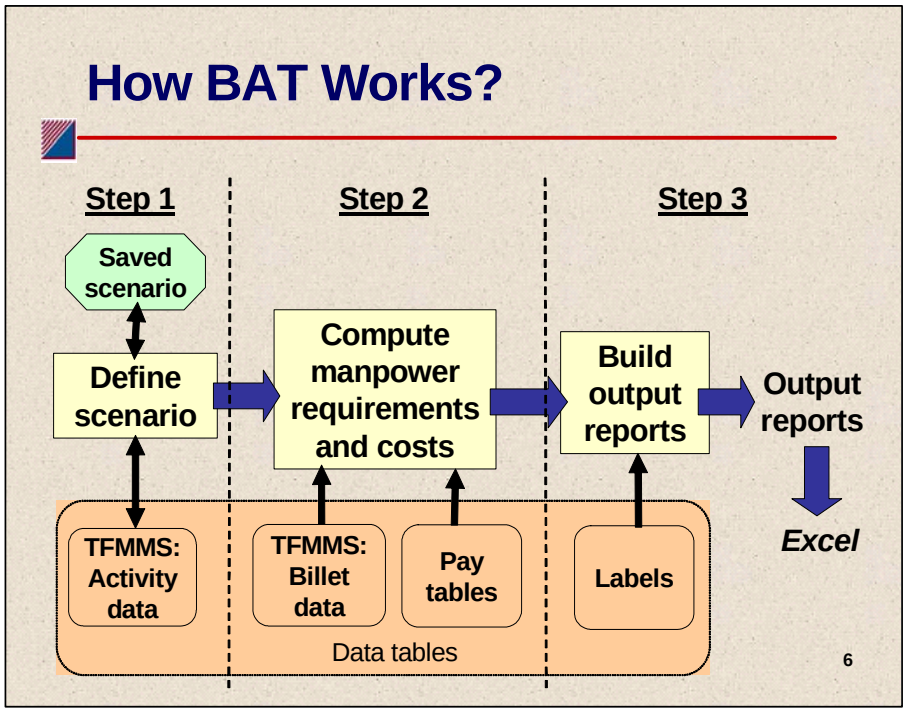
To provide leadership insight into how many IAs the Navy can provide, Fleet Forces Command in conjunction with Naval Personnel Command developed a set of capacity models. These models

determine the number of Navy personnel within each skill area (rating/designator) and pay band that the Navy can provide to fill manpower augmentation requirements. The models calculate two output measures: capacity and availability. Capacity is the total number of IA requirements that the Navy can sustain. Availability is the unused capacity and accounts for servicemembers currently serving on IA assignments. Business rules define the level of support each activity can provide. Current rules define minimum manning levels at 90 percent of billets authorized for sea activities and 75 percent for shore activities. There are also activities (both sea and shore) that are exempt from providing any IAs and contribute no capacity.

Mr. Belcher presented results that illustrate the key factors that affect IA capacity. These include the distribution of billets across the three types of activities (sea, shore, and exempt), current manning levels, and distribution of billets for each skill and pay band by activity. He also showed how changes to the business rules' minimum manning levels affect capacity and what happens if you calculate capacity over combined paygrades and designators.

Mr. Belcher ended his presentation by describing the next phase of this study, which will address two issues. The first is whether servicemembers with particular characteristics were more likely to be selected for IA assignments. Some characteristics, such as paygrade and occupation, may be explicit requirements of the IA request, while other characteristics, such as race/ethnicity and marital status, are not. CNA will examine whether active duty personnel were disproportionately selected for IA assignments, or assigned to lengthier or more dangerous locations based on personal characteristics that are not material to the IA assignment itself. The second issue is whether IA assignments have affected the career progression of active duty servicemembers. Of particular interest are the effects on retention, promotion, and sea/shore rotation for active duty enlisted Sailors and officers.

Figure 25. BAT is a three-step force structure computation[a]



a. Source: Mr. Steven Belcher, *Billet Analysis Tool (BAT),* briefing presentation for the Seventh Annual Navy Research and Analysis Conference, 2007.

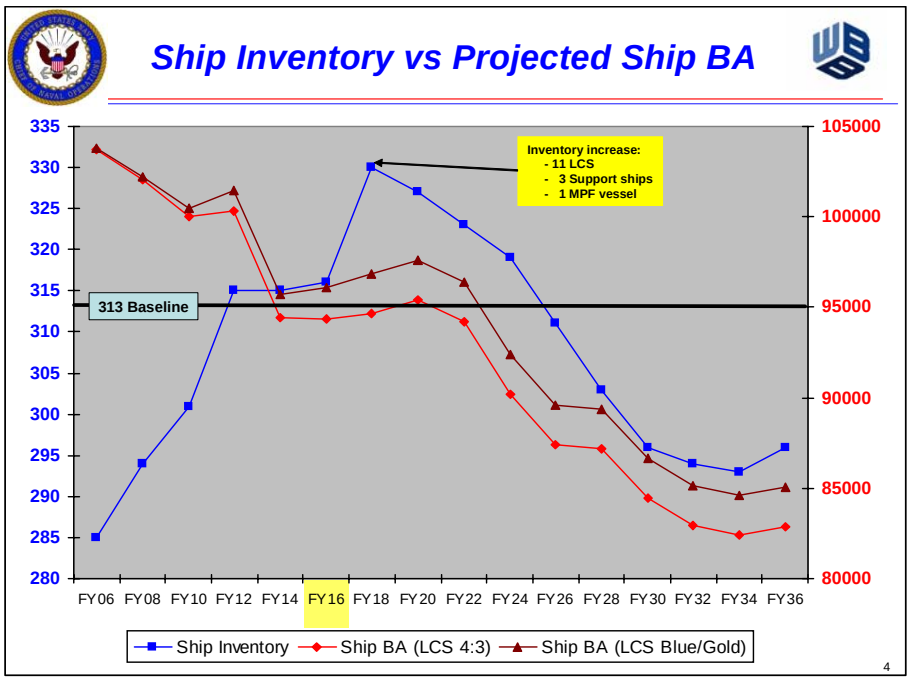
N12 Billet Analysis Tool

Mr. Mark Proctor (WBB Consulting) presented a user's perspective of the BAT. Some examples he gave of using the tool include developing manpower requirements beyond the FYDP with different force structure scenarios, analyzing the impact of a 30-year shipbuilding plan on manpower requirements, analyzing future force structure impacts on community health, community management utilization of TFMMS data, and identifying the "trade space" for manpower requirements in the FYDP.

The future billet tool capability will enable analysts to select, prioritize, and implement upgrades resulting from the user pilot. It will also expand distribution to other users, such as community managers, enterprise leads/Budget Submitting Offices (BSOs), and type commander N1s. In the future, CNA will develop the Phase II – Shore

Support Module, which will establish the correlations between force structure and shore infrastructure and enhance capability-based analysis/costing. BAT will be capable of incorporating Total Force Authorization and Requirements System (TFARS) data following the conversion of TFMMS to TFARS. Furthermore, application of the tool will expand to other tasking to include military-to-civilian conversions ($$$/impacts)/competitive sourcing analysis, sea/shore rotation working group applications, home basing/stability analysis, disaster planning analysis, and training and education requirements analysis. Future developments will also entail enhanced coordination between enterprise leads, BSOs, and community managers for POM/PR builds. Finally, BAT will include "women at sea analysis" and "sizing the Navy."

Figure 26. Projections of ship inventory and projected ship billets authorized (BA)[a]



a. Source: Mr. Mark Proctor, *N12 Billet Analysis Tool,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Creating a Framework for a New Shore Manpower Requirements Determination Process

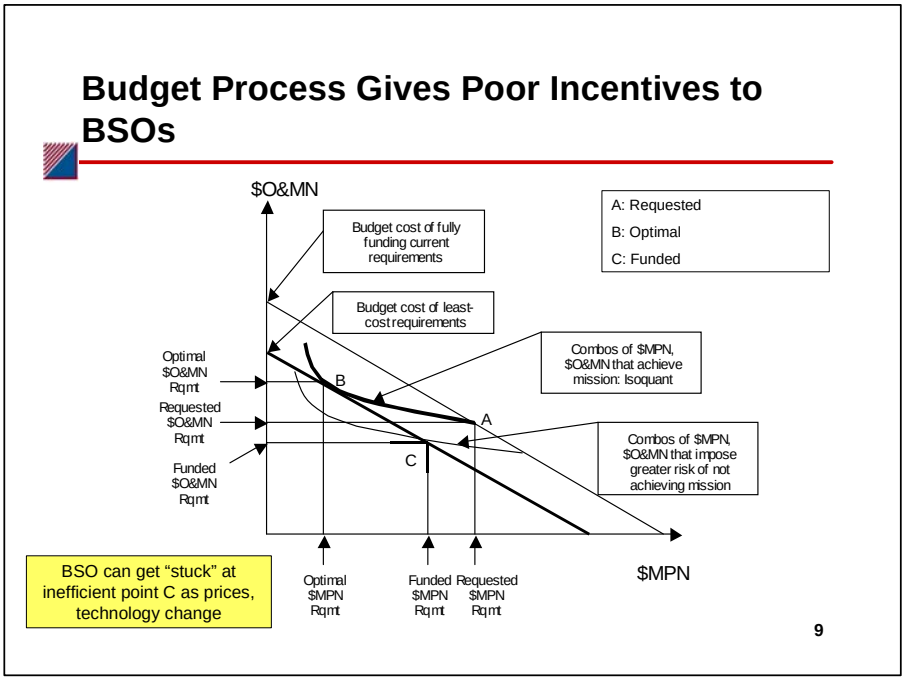
Dr. Albert Monroe (CNA) discussed current problems and possible solutions for the Navy's Shore Manpower Requirements Determination Process (SMRDP). The Shore Manpower Program was decentralized into 20 BSOs resulting in multiple ownership back in 1986. This fragmentation has, however, created some difficulties with respect to manpower requirements determination. The components of determination include shore requirements (69 percent of the Navy's Total Force (active, reserve, civilian, and contractor)), sea requirements (battle forces), and individual accounts. Manpower requirements determination is done without considering funding constraints. According to Dr. Monroe, several issues are at hand. First, how large should the shore infrastructure be in order to support warfighting capability requirements? Second, a flexible, consistent program based on future directions and acquisitions is needed. Third, N1 needs a valid and transparent process by which to determine shore manpower requirements.

According to Dr. Monroe, there is evidence that the SMRDP has problems. First, SMRDP is not measuring up to GAO auditing standards. GAO recommends improvements to management oversight and accountability, use of standardization and competitive analysis in the process, increased staff training, and creation of a link between SMRDP and other Navy activities in order to reduce shore infrastructure. Furthermore, competitive sourcing provides evidence of overmanning at Navy shore commands. First, competitive sourcing leads to expected savings of 35 percent. Second, competing military billets leads to expected savings of 46 percent. Finally, GAO has found widely differing requirements for similar tasks around the Navy. Another problem pointed out by Dr. Monroe is that the budget process gives poor incentives to BSOs in terms of optimizing O&MN and MPN dollar requirements. All of these findings suggest inefficiencies in shore manning.

Dr. Monroe presented options for setting manpower requirements. First, he discussed three methods of determining shore manpower requirements: industrial engineering (e.g., influencing and

translating workloads), workforce planning (e.g., applies incremental changes to the workforce), and competition of non-government-essential functions. The Navy is likely to use a combination of these methods to determine manpower requirements. There are advantages and disadvantages to each of the methods. In summing up manpower requirements options, Dr. Monroe stated that setting Navy shore requirements is so different from setting Navy sea requirements that industrial engineering, used for sea requirements, is not appropriate for most Navy shore work. He said that more opportunities should be sought out to expand competitive sourcing. Although workforce planning is harder to standardize, it allows changes to be made to manpower requirements as prices and technology change. Finally, BSOs need both accurate data and incentives to use manpower efficiently.

Figure 27. Process inefficiencies and optimization requirements[a]



a. Source: Dr. Albert Monroe, *Creating a Framework for a New Manpower Requirements Determination Process,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In summary, Dr. Monroe believes that the SMRDP can be "fixed" by determining more work that is eligible for competition and by increasing transparency through accurate cost data on workload drivers, effective management and accountability, and well-trained staff. Dr. Monroe makes several recommendations to the Navy. First, he recommends that the Navy develop SMRDP guidelines for all BSOs to follow. In addition, the sea requirements process should not be applied to shore requirements. All "Rotation" and "Career Progression" billets should be subject to cost analysis and review. Also, he suggests that the Navy should take a harder look at all billets ineligible for competition by tradition or DoD decision. He believes that incentives of BSOs and Navy for use of military manpower should be aligned. He further recommends calculating actual activity costs rather than estimated activity costs. Finally, staff should be trained in cost analysis, process improvement, and workload and skills capture in central locations and at BSOs.

Research Presentations: Session III

Officer Models

Officer Personnel Information System (OPIS)

Dr. Rick Butterworth (PSI) and Rick Loffredo (CSC) began the presentation by stating that the Navy has collected 33 years of officer personnel data in the Officer History File (OHF), a flat file of annual inventory and change records extracted from the Officer Master File. They report that these data are a valuable resource for research and analysis of long-term force planning questions.

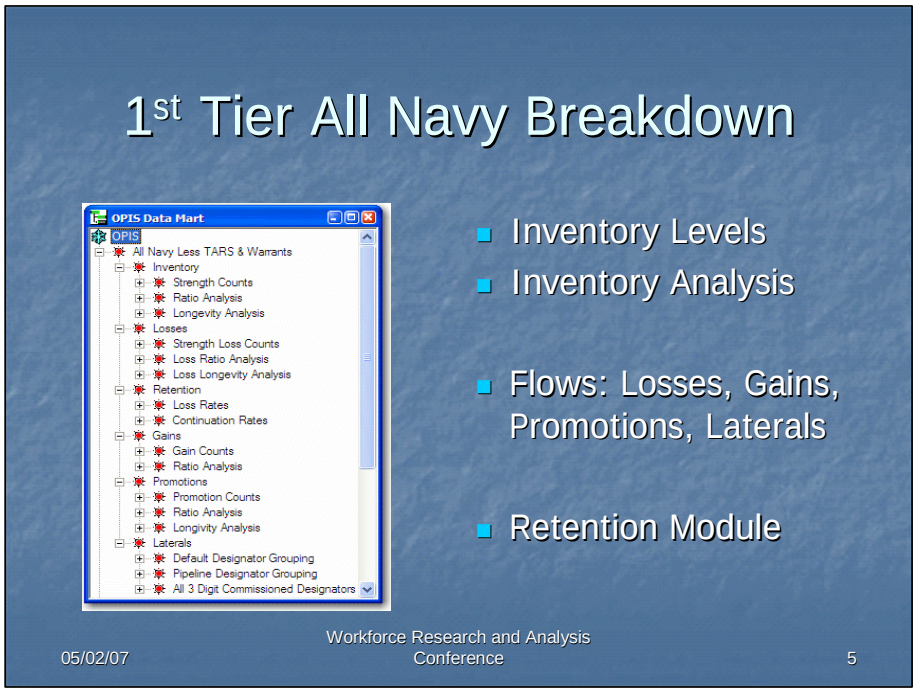
Dr. Butterworth explained that the data in the OHF can be examined through OPIS, a multidimensional summary system for viewing and analyzing officer data. OPIS allows users to break down the officer force by multiple dimensions simultaneously. Possible dimensions include fiscal year beginning in 1974 through the present. Designators for several groupings are available, including Ethnic, Gender, Paygrade, Commissioning Source, and Years of Commissioned Service. These breakdowns are also available for a number of personnel flows, including losses, gains, promotions, and laterals.

According to Dr. Butterworth, the OPIS analysts/users can quickly and intuitively sort through and view just what they want to see. While browsing the force structure, it is easy to drill down total for detail, to individual officer records. He said that record-level viewing is intended to illuminate the idiosyncrasies of the personnel system and serve as a quality control check.

In conclusion, Dr. Butterworth said that data, along with an appropriate system for viewing it, is an especially effective way to understand complex systems such as the officer personnel system. While OPIS represents a step in the right direction, more data could be integrated

to such databases to broaden our understanding of long-range issues—namely, the 2025 Total Force.

Figure 28. Multidimensional summary of personnel flows[a]



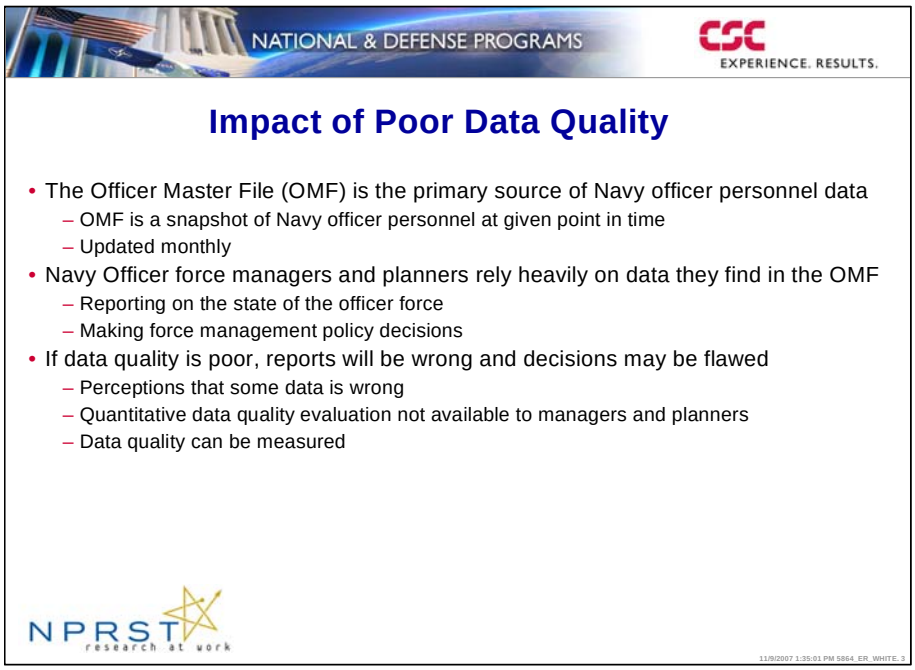
a. Source: Dr. Rick Butterworth and Dr. Rick Loffredo, *Officer Personnel Information System (OPIS),* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Personnel Data Quality Research

Dr. Rick Loffredo (CSC), Gary Ropp (CSC), and Rodney Myers (NPRST) presented research on personnel data quality. According to the analysts, officer and enlisted force managers base policy and other decisions on the data they are provided. When the quality of the data is questionable, the decisions based on the data may be flawed. For example, the Officer Master File (OMF) contains personnel data for Navy officers that are used by Navy officer force managers and others to report on the state of the officer force and to make force management policy decisions. There is evidence that some of the

data on which they rely is erroneous, but there is no readily available quantitative means for measuring the quality of the data. Also, there is no effective means of systematically identifying errors and reporting data quality metrics.

Figure 29. Concerns with poor data quality[a]



a. Source: Dr. Rick Loffredo et al., *Personnel Data Quality Research,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Loffredo's team discussed ways that erroneous data might be identified. Standard methods for measuring data quality involve identifying obvious errors in data, such as missing data, data in wrong format, and data values out of known bounds. Another method is to divide the number of errors for a field in a given file by number of records to obtain error rate for that field. An alternative is to report and monitor error rates to gain quantitative understanding of data quality. These methods allow users to have a realistic level of confidence in the data, and they provide a mechanism for identifying data problem areas that need to be fixed.

Dr. Loffredo's team made several recommendations. First, regular reporting and monitoring of data quality metrics would result in improved data quality and, thus, more accurate reports and more informed policy decisions. They stated that simple data quality measurements can be easily implemented based on identifying obvious data errors, while less obvious data errors can be identified using relationships among data fields. They presented the logic for identifying these types of errors in this study. Also, data quality metrics can be assigned to fields for each data file and the overall file. Dr. Loffredo recommends that the logic be implemented into a computer program, preferably a table-driven rules engine. He recommends monthly data quality reports that are generated and monitored by Navy personnel experts. The logic should be improved based on feedback. Finally, Dr. Loffredo's team recommends quantifying data inconsistencies to assign confidence levels to the data and to motivate data improvement.

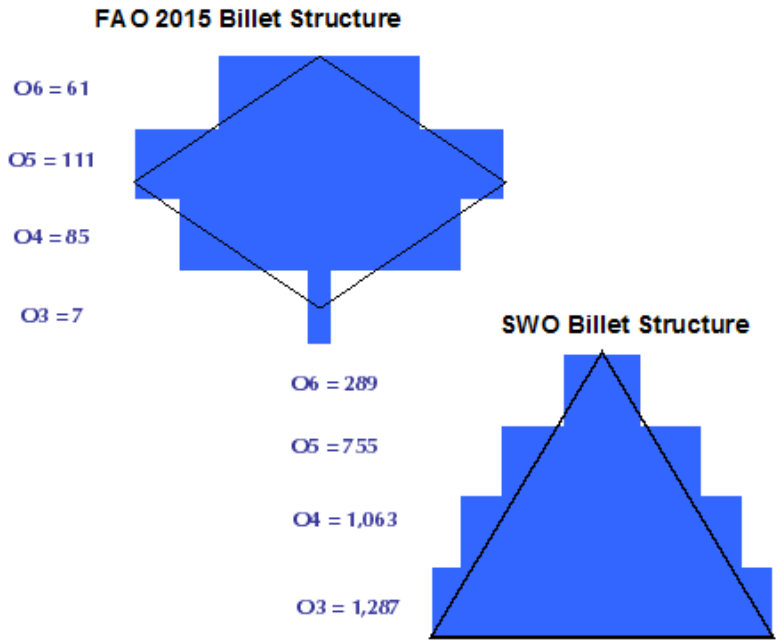
Foreign Area Officer (FAO) Community Management

In FY 2006, the Navy created a separate restricted line community for Foreign Area Officers (FAOs). Before that, Dr. Amanda Kraus (CNA) and Dr. Ann Parcell (CNA) explained, officers may have earned an FAO additional qualifying designator or a regional subspecialty code, but they remained in their community of origin. The new FAO community has already created a planned billet structure for FY 2015 and created an accession plan to meet that goal. According to the analysts, three challenges are unique to the community: (1) it will be populated by lateral transfers of initial rank O3 to O6; (2) 65 percent of the FAO non-flag operational billets are at the O5 and O6 level, unlike the Unrestricted Line, which has only one-third of its O3–O6 billets at the O5 and O6 level; and (3) most of the planned billets are in overseas locations.

Dr. Kraus and Dr. Parcell found that the accession plan and the personnel rules create a pyramid-shaped inventory, while the billet structure is more diamond-shaped. They discussed how this creates tradeoffs between filling the O6 requirement and exceeding the O4/O5 requirement, even when we alter the accession plan using reasonable alternative assumptions. They also found that a rotation from

outside the continental United States (OCONUS) to CONUS every 3 years is not sustainable given the large number of billets overseas. However, the community can take steps to mitigate this challenge. Finally, Dr. Kraus said that ROI on FAO training has already been improved by setting up a separate FAO community, although other ROI issues remain.

Figure 30. The tradeoff between O6 and O4/O5 requirements[a]



a. Source: Dr. Amanda Kraus and Dr. Ann Parcell, *Foreign Area Officer Community Management,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Global War on Terror (GWOT)

Dwell Times and Other Deployment Issues for Navy 8404s

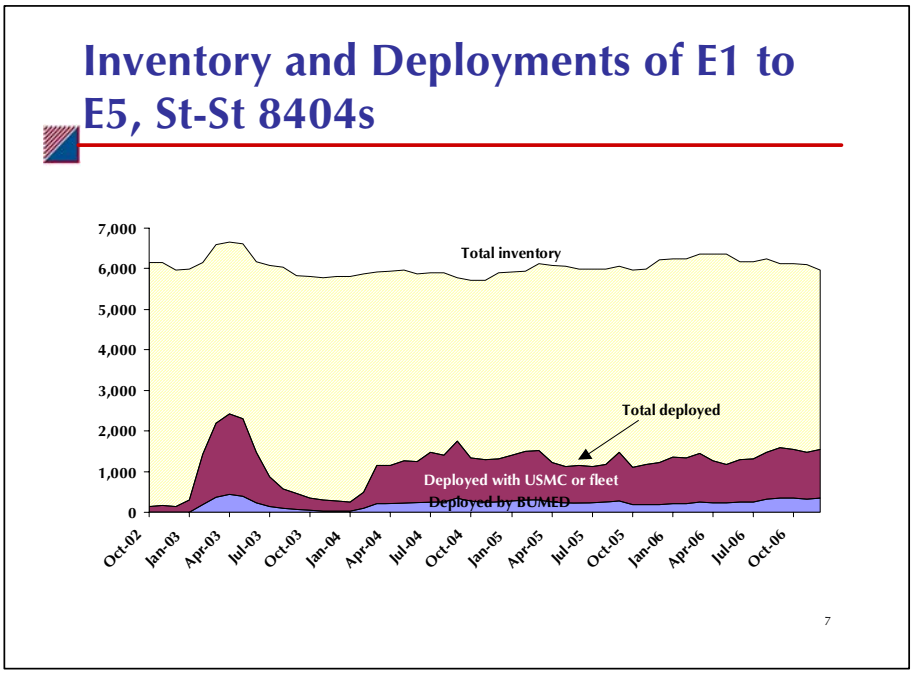
Dr. Robert A. Levy (CNA) presented a study that examined some specific questions asked by BUMED concerning dwell times and other deployment issues. First, the study looked at the level of "stress" on hospital corpsmen (HMs) as a result of frequent deployments to Iraq.

BUMED also wanted to know when Navy Medicine might "run out" of 8404s (i.e., HMs). Furthermore, BUMED asked if there are enough 8404s to allow 12- to 18-month dwell times. To answer these questions, Dr. Levy first examined recent deployments of 8404s. The study tracked those who have deployed since October 2002 for GWOT, mainly in Iraq and Afghanistan, and a simple model was designed to analyze stress on the 8404 community and to determine requirements to allow 12- and 18-month dwell times.

All Budget Submitting Office (BSO) 18 and 27 deployments were tracked, as were deployments before and after BSO 18. Results for BUMED and USMC 8404s (E1–E5, steady-state (St-St)) were tabulated for the number of deployments, number of Sailors deployed, average days deployed, and average dwell time. Results were also captured for redeploying E1–E5 8404s. In addition, inventory and deployments of E1–E5, St-St 8404s were measured. Stress on the force was defined in terms of availability for use—that is, when the force is not currently available because of limits on rotation. In the current case study, stress meant having to send out some 8404s "too quickly." Dr. Levy determined that “too quickly” refers to dwell time less than 12 or 18 months. He also dealt with the question, When does “some” become “too many”?

A stress index was created by subtracting recently deployed from total inventory and dividing by those currently deployed. If the index is negative, stress level on the force is unsustainable; if greater than 1, it is sustainable. Next, the study looked at how many 8404s are required to ensure at least 12- or 18-month dwell times. The starting assumptions were that there is a 36-month shore tour at a military treatment facility (MTF), 1 deployment of 12 months during that time, and 3 months’ time on station at the beginning and the end. According to Dr. Levy, the simple model suggests a requirement of about 650 BUMED personnel in the steady state who remain at MTFs to support the 12- to 18-month dwell time requirement. Numbers show an inventory of more than 2,600 with only about 1,500 ever deployed. The implication is that there are sufficient numbers within BUMED to manage dwell time.

Figure 31. Total inventory and deployment of HMs[a]



a. Source: Dr. Robert Levy, *Dwell Times and Other Deployment Issues for Navy 8404s,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In conclusion, Dr. Levy said that data suggest many more redeployments outside BSO 18 (i.e., BUMED), and the stress index is approaching a worrisome point for 8404s. There have been relatively few in BSO 18 that have had multiple deployments, but averages tend to hide stress on specific individuals. Dr. Levy said the simple model suggests that there are more than enough 8404s to support 12- to 18-month dwell times—a finding that should be compatible with BUMED deployment policy.

Stress on the Force and Retention in the Long War

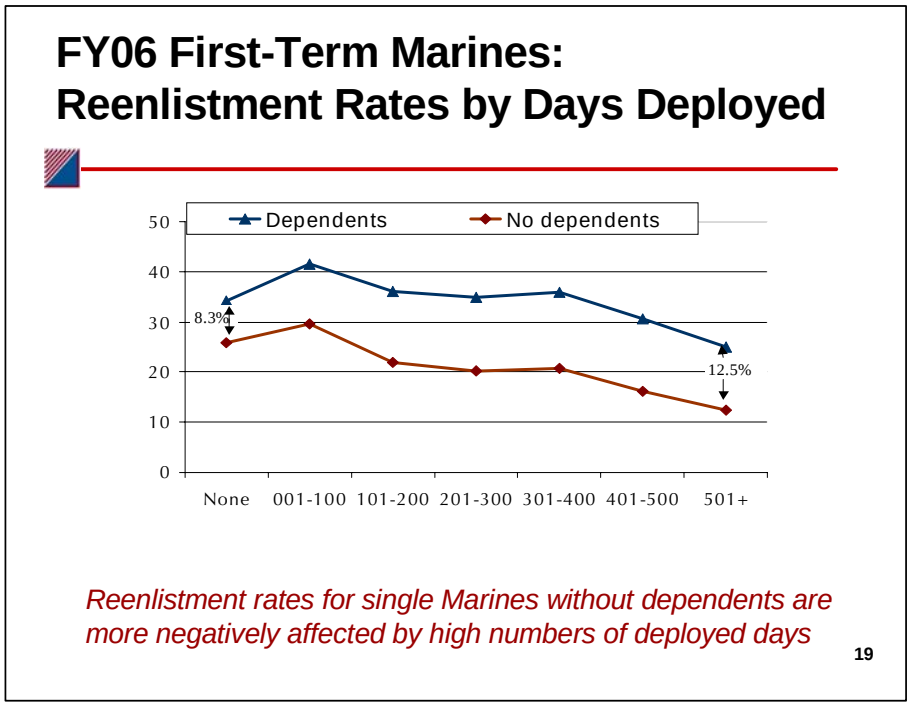
Dr. Aline Quester (CNA), Anita Hatttiangadi (CNA), and Gary Lee (CNA) discussed their research findings that examined stress and retention levels of Marines associated with the prolonged war. The study found that, to date, the Marines are handling stressful situations very well. First, the numbers of domestic and child abuse incidents

have declined steadily from 2001 to 2005. Comparative divorce rate measures for enlisted and officers, and men and women, have also remained steady from the mid to late '90s though 2006. The number of deserters has actually declined from 2000 to 2006. The suicide rate per 100,000 Marines continues to be lower than the national average. Data for the time period between 1990 and 2001 show that the percentage of male first-term attrition declined. Positive drug tests have remained relatively stable between 2001 and 2006.

In terms of recruit quality, USMC recruits with a high school diploma have reached around 95 percent, which is above the OSD requirement of 90 percent. Also recruits scoring in the top 50th percentile (% Smart) of the national norm test is 63 percent, which is above the OSD requirement of 60 percent. Research shows that quality does make a difference. Of 750,000 recruits entering from FY79 to FY00, first-term attrition was 32 percent for % Smart high school diploma graduates (HSDGs) and 57 percent for non-HSDGs. Dr. Quester's research shows that first-term Marine reenlistments are top-quality graduates. Also, the quality of the population has steadily improved over the last 5 years. Officer retention and quality are also high.

Dr. Quester reported that there is strain on the force, however, as a result of less ability to take leave, higher operational tempo, and less time to train. At the end of each fiscal year, leave balances are reduced to 60 days for active duty Marines. The number of Marines who are losing leave is increasing as deployment time increases. For the junior-level Marines, E3s and E4s, the increase in leave balance translates into extra work days. Single Marines with no dependents, who make up over half of the first-term population, experience a higher rate of deployment. Marines reenlist at lower rates. Career Marines who have served more terms continue to reenlist regardless of frequency and type of deployment more than those who have shorter lengths of service. From December 2005 through December 2006, officers' continuation rates generally increased with more deployed time or deployments to crisis areas. Finally, between 2001 and 2006, there has been a substantial decrease in time to train in exercises, placing more strain on the force.

Figure 32. Marines without dependents deploy more and reenlist less[a]



a. Source: Dr. Aline Quester, Ms. Anita Hattiangadi, and Mr. Gary Lee, *Stress on the Force and Retention in the Long War,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Analysis of Navy Individual Manpower Augmentation Process

Mr. Steven Belcher (CNA) and Dr. Peggy Golfin (CNA) discussed the process of Navy Individual Manpower Augmentation, which is the unfunded, unplanned allotment of Navy manpower to augment existing units and organizations. Navy Individual Augmentees (IAs) allow Navy and Combatant Commanders to effectively perform their assigned missions. IA requirements—found in Joint Manning Documents (JMDs), Requests for Forces (RFFs) and Navy unit/activity augmentation requests—are filled by both active and reserve personnel.

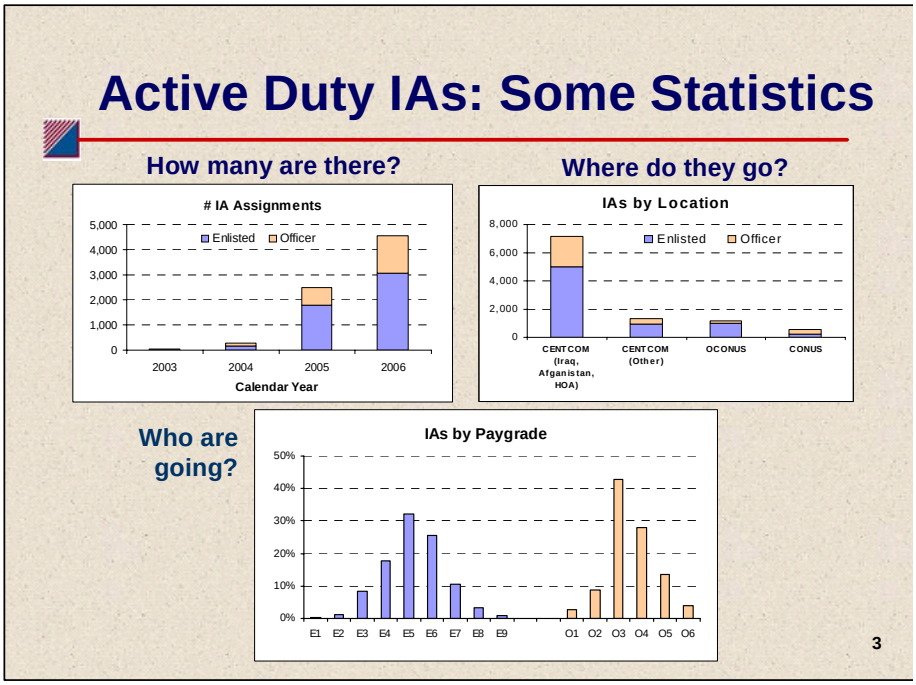
Mr. Belcher presented statistics on the number of IA assignments, where they go, and the paygrades assigned. While both officer and enlisted IAs have increased, enlisted augmentees have increased dramatically between 2003 and 2006. By location, Centcom has the highest levels of IAs. Among the enlisted ranks, E5s make up the largest

percentage; among officers, O3s are most prevalent with most fills being made by Unrestricted Line Officers (URLs). Among the enlisted ranks who are going, MAs, ITs, and HMs account for about 50 percent of all IAs. Sourcing of IA requirements involves a process of gathering requirements from authorized documentation, conducting a sourcing assessment phase to provide data to Navy leadership, obtaining a Navy response, developing tasking, and conducting a sourcing execution phase to determine current capacity. Augmentees must then be mobilized, screened, trained, equipped, and transported before filling the assignment.

The IA Active Component Capacity model calculates the capacity and availability of enlisted and officers to support augmentation assignments. Calculations are performed at the activity (i.e., Unit Identification Code (UIC)) level. Current business rules are applied using three levels of activity support: exempt, sea, and shore. The model then calculates capacity and availability. Key factors in the IA capacity model are the distribution of billets across the three types of activities, current manning levels, and distribution of the number of billets for each skill and payband by activity. Mr. Belcher presented results from the model, such as (1) capacity for enlisted high-demand/low-density skills, (2) officer billets vs. capacity by redline category, (3) distribution of BA per UIC: officer shore duty, (4) officer capacity and availabilities vs. redline level: shore duty, (5) officer capacity and availabilities vs. redline level: sea duty, and (6) officer capacity and availabilities vs. redline level: exempt activities. Research shows that capacity depends on inventory allocation/distribution. That is, IA capacity for the same total requirement (BA) and inventory (COB) varies depending on how manpower is distributed across activities.

In conclusion, Mr. Belcher said that ongoing analysis will determine if Sailor selection is random, and if Sailors possessed certain demographic or other characteristics that determined length or type of deployment. Future analysis will also look at what course augmented Sailors took after they returned in terms of retention, promotion, sea/shore rotations, and behavioral issues.

Figure 33. Individual augmentees: How many, where they go, and who's going[a]



a. Source: Mr. Steven Belcher, *Analysis of Navy's Individual Manpower Augmentation Process,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

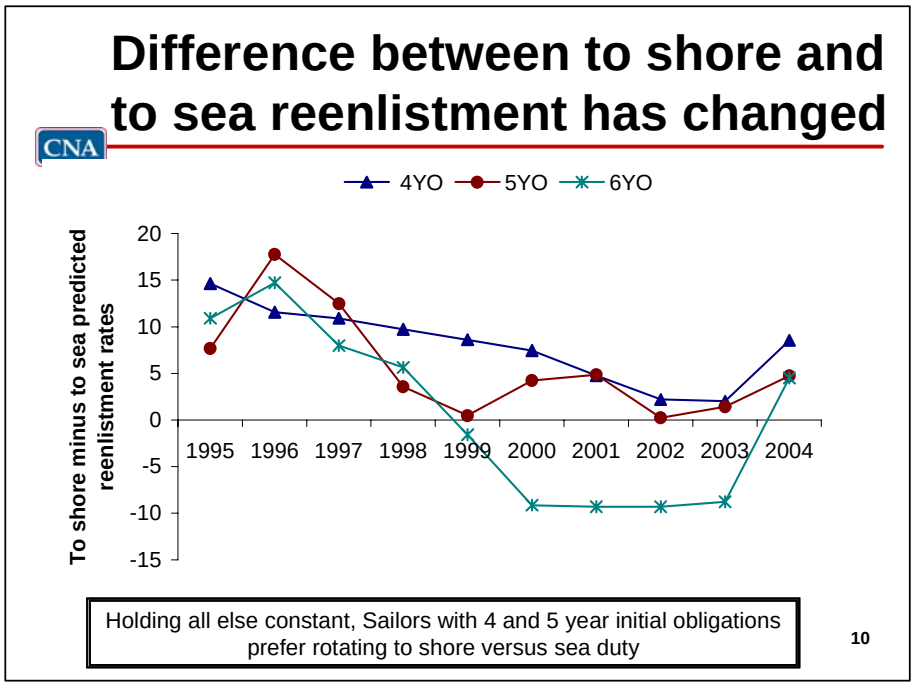
Recruiting, Attrition, and Retention

Effect of Sea Duty on First-Term Reenlistment

Dr. Cathleen McHugh (CNA) and Dr. Diana Lien (CNA) conducted research in response to descriptive statistics that may suggest a change in the impact of sea duty on first-term reenlistment. Some analysts believe that a shift toward mission-centric careers may influence sea duty and deployment patterns. Dr. McHugh and Dr. Lien noted a decline in the reenlistment patterns of early 2000 and a slight change in the amount of time spent on sea duty for 4YOs, 5YOs and 6YOs, with a 6-percent increase among 4YOs from FY95 to FY04. Furthermore, there has been a 24-percent increase from FY95 to FY04 among 4YOs. Past studies have indicated that expected sea duty has a negative impact on retention, while more recent studies have shown a small positive impact for deployments to nonhostile mission areas.

Dr. McHugh and Dr. Lien used FY95–FY94 decision data to examine the effect on first-term reenlistment of Sailors who expected sea duty in the second term and those assigned to first-term ship activities. The models held some variables constant, including expected military versus civilian pay and Sailor's demographic and career characteristics. Research indicated that Sailors at all levels (i.e., 4YOs, 5YOs, and 6YOs) prefer rotating to shore duty. Furthermore, Sailors with 4- and 5-year initial obligations prefer rotating to shore versus sea duty. The analysts found no significant effect of marginal increases in expected sea duty. They did find, however, that the number of deployment spells in the first term matters. The effect of deployment spells on 4YOs has been even larger since September 11th, 2001, and research shows that increasing time spent on ship activities has little effect on reenlistments.

Figure 34. Predicted reenlistment rates as differences between shore and sea[a]



a. Source: Dr. Cathleen McHugh and Dr. Diana Lien, *Effect of Sea Duty on First-Term Reenlistment,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

These results show that, although marginal increases in sea duty or deployments have little effect on retention, significant changes do have a negative effect on retention. A decrease in Sailor reenlistments occurs with an increase in deployment spells and with high expectations of rotating to sea duty at first term decision, which are likely consequences of new sea/shore rotation policy changes and alternative manning concepts. Dr. McHugh and Dr. Lien recommend that these negative effects from a change in sea duty be addressed by (1) offering a break from sea duty that corresponds with first-term reenlistment decisions, (2) encouraging sea duty assignment extensions through offering incentives involving more choice and flexibility, and (3) using compensation tools, such as selective reenlistment bonuses and assignment incentive pay.

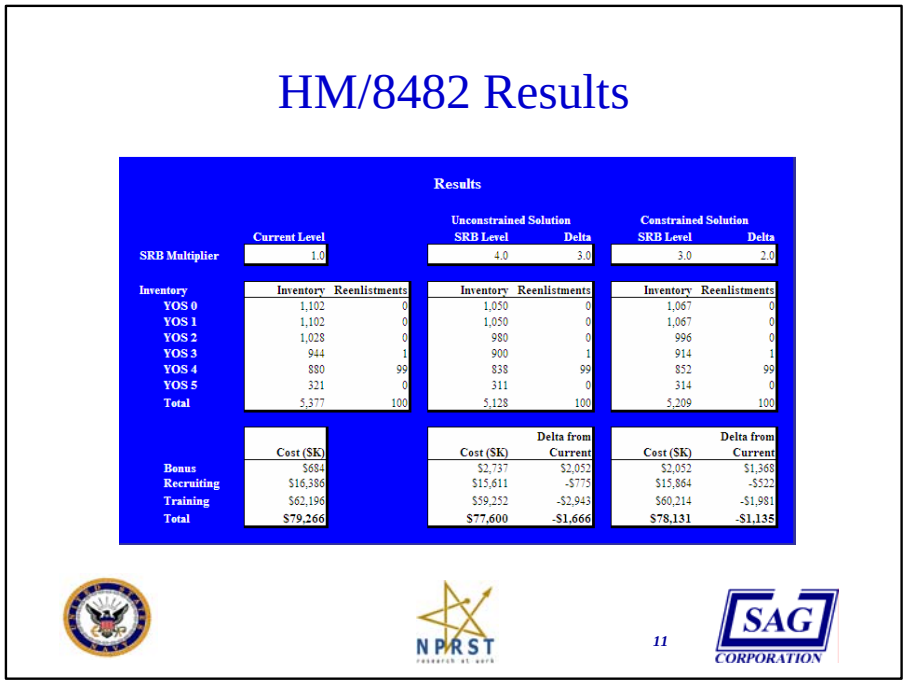
Retention–Accession Tradeoff Model

Mr. Ricky Hall (NPRST) and Mr. Patrick Mackin (SAG Corporation) began the briefing stating that the Navy enlisted community requirements are usually established without regard to economic efficiency. Personnel policies are used to sustain a set of requirements based on historical accession and retention patterns. However, the most efficient enlisted force for a particular community depends on the relative costs of acquiring and retaining the correct number of trained personnel.

Mr. Hall and Mr. Mackin presented findings from their study of the least-cost combination of accession and retention policies. First, they gave an overview of the Navy Retention-Accession Tradeoff Model. The results focused on Zone A enlisted communities. Their methodology was based on known econometric relationships involving the elasticity of reenlistment behavior, using a steady-state model. The model used costs of bonuses to achieve higher reenlistment rates offset by savings in training and recruiting costs. The model also accounts for (1) accession supply and effects of enlistment incentives, (2) EAOS continuation behavior and effects of compensation on reenlistment, (3) non-EAOS continuation behavior, and (4) variable initial contract lengths and early reenlistment policies. Furthermore, the methodology is based on relative costs of obtaining specified number of Zone A reenlistments. It compares costs of recruiting, training, and Selective Reenlistment Bonuses (SRBs) for alternative paths to the same goal, which involves tradeoffs between quality, quantity, and cost. The model holds the number reenlisting in the first term constant, varying strength and MPN costs over the first term. The results are also conditional, based on external conditions.

The findings highlight communities for which the steady-state combination of retention and accession policies is markedly different from current force structure. Results indicate that high-training cost skills generally justify a higher SRB, as illustrated by Pharmacy Technicians (HMs/8482), Aviation Ordnancemen (AOs), and Missile Technicians (MTs). For example, HMs have a relatively high training cost of $56,450. The model recommends increasing the current SRB level of 1.0 to 4.0 (unconstrained). Imposing a first-term endstrength floor reduces optimal SRB. The cost of the higher bonus was more than offset by a 5-percent reduction in the size of the accession cohort and reduces training and recruiting costs. The model confirmed the assumed relative price inelasticity for MTs (i.e, military pay has small effect on change in reenlistment behavior.) Future research will extend the methodology to second reenlistment decisions. Also, a more generalized model of optimal manning will look at the entire career and the effects of promotion and rotation policy.

Figure 35. Retention–accession tradeoff for HMs[a]



a. Source: Mr. Ricky Hall and Mr. Patrick Mackin, *Retention-Accession Tradeoff Model,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Emerging Issues in USMC Recruiting

Ms. Anita Hattiangadi discussed two emerging issues in USMC recruiting—enlistment waivers and homeschoolers. She acknowledged recent concern about the number and types of waivers being granted. Her examination of the data, however, found that the share of Marine recruits with enlistment waivers, although up slightly from 2002, is still below levels reported in the late 1990s. Today about half of all Marine recruits enter with waivers, with the largest share of waivers being granted for drug use (since the Corps requires a waiver for even one-time use.)

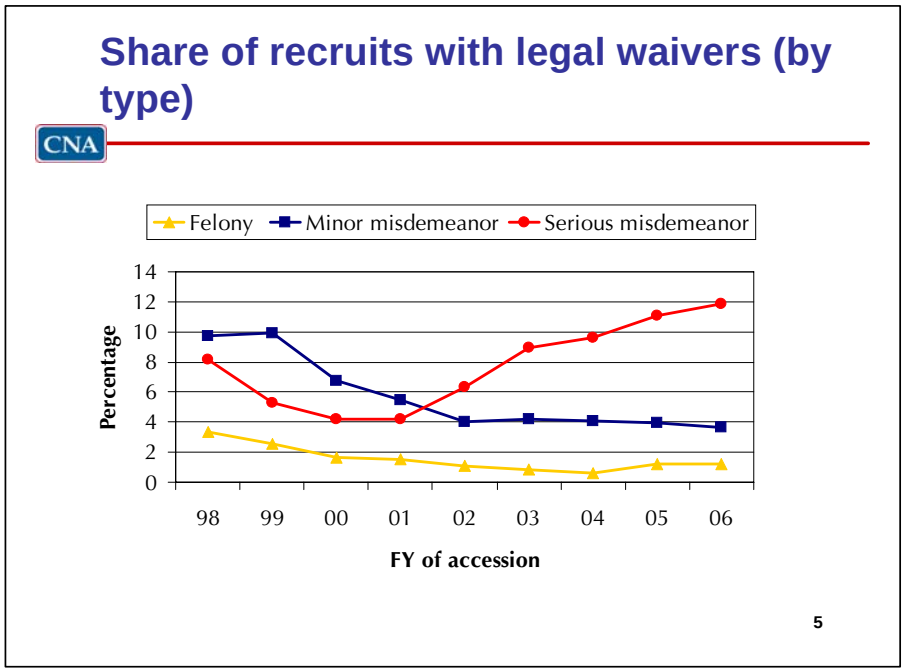
About 30 to 35 percent of recruits enter with one waiver; about 15 percent have two; less than 3 percent have three or more waivers. Ms. Hattiangadi found that bootcamp attrition rates increase with the number of waivers. A relatively small share of recruits enters with legal waivers. By type, felony and minor misdemeanor waivers have generally fallen over time, whereas serious misdemeanor waivers have increased.

Ms. Hattiangadi then presented data on MCRD attrition by waiver type and gender for FY03–FY05 accessions. She found that those with legal waivers actually had relatively low bootcamp attrition rates—either at or within a few percentage points of average bootcamp attrition rates and below the rates for those with some other types of waivers (such as dependents or physical issues). That said, those with legal waivers were more likely than others to be separated for misconduct. Over 24 months, however, recruits with legal waivers had attrition rates only a few percentage points above the average attrition rate and were generally in keeping with those of all recruits with waivers.

Finally, Ms. Hattiangadi presented results on the percentage of Marines receiving meritorious promotions. She found that recruits with waivers were as likely as all recruits to be meritoriously promoted to the grades of E3 through E6. Furthermore, compared with all Marines, a greater or equal share of Marines with legal waivers was meritoriously promoted to lance corporal and corporal. At sergeant, the shares are equal, with those with minor misdemeanors having a higher probability of meritorious promotion and those with felony and serious misdemeanor waivers having a slightly lower probability

of meritorious promotion. Marines with legal waivers have a lower probability of meritorious promotion to E6 than other Marines.

Figure 36. Percentage of enlisted recruits with legal waivers[a]



a. Source: Ms. Anita Hattiangadi and Dr. Jennie Wenger, *Emerging Issues in USMC Recruiting,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In a second presentation, Ms. Hattiangadi presented the work of Dr. Jennie Wenger on homeschoolers. Dr. Wenger's study first examined whether homeschoolers from the South (where homeschooling is more prevalent) or those from states with homeschool regulations were more likely to be successful. She found that homeschoolers from the South performed slightly worse than others, and homeschoolers from states with regulations performed only slightly better than those from nonregulated states.

Dr. Wenger then analyzed the performance of the most recent cohort of homeschoolers (those who accessed in FY04–FY05). She found that they have performed better so far than the FY02–FY03 cohort. Specifically, they have lower bootcamp and first-term attrition rates.

Furthermore, Dr. Wenger found that homeschoolers with high scores (above 50) on the Armed Forces Qualification Test (AFQT) had boot-camp and 12-month attrition rates that were comparable to those of high school diploma graduates, whereas homeschoolers with low AFQT scores had rates more like those of GED holders. The work is caveated by the fact that it is too early to fully assess 24- and 36-month attrition for the FY04—FY05 homeschooler cohort.

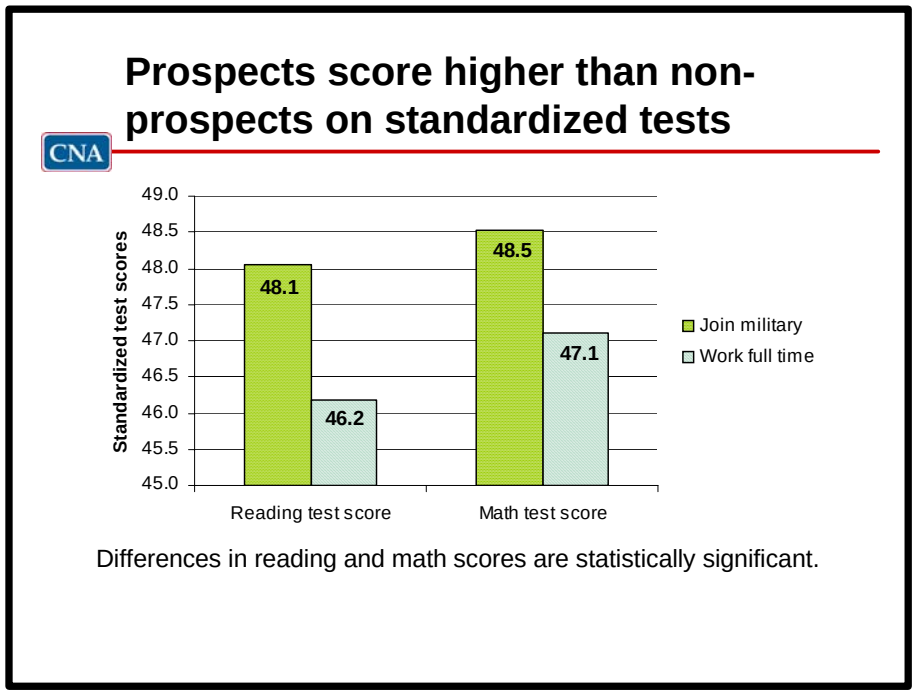
Comparing the Socioeconomic Characteristics of Military Prospects and Non-Prospects

The presentation given by Dr. Cathleen McHugh (CNA) and Ms. Anita Hattiangadi (CNA) addressed the persistent concerns that those in the military may be more disadvantaged than the general population. They said the media reports that the military "lures" new recruits. In their study, they compare characteristics of recruits in three ways: (1) compare enlistees with a national sample of youth, (2) match enlistees by ZIP code to Census data and compare their local area characteristics with those of a national sample of youth, and (3) identify those who planned to enlist (prospects) in a national dataset and compare them with those who did not plan to enlist (non-prospects) in the same dataset.

Dr. McHugh's and Ms. Hattiangadi's research from the Education Longitudinal Study of 2002 shows that the sample of prospects among male high school seniors intend to enlist, while non-prospects intend to work full time. Those who intend to pursue postsecondary education (PSE) after high school and high school dropouts were omitted. Characteristics of prospects and non-prospects were examined, such as family background, high school experiences, and attitudes about PSE. The data showed no statistically significant difference between prospects and non-prospects with respect to parental education levels or with respect to family composition (i.e., one-parent or two-parent households). Degree of urbanization (i.e., urban, suburban, or rural upbringing) showed no statistically significant difference. Statistically significant differences were found in the following cases. Standardized test scores are higher for prospects than for non-prospects. Black prospects are less likely to come from disadvantaged schools than non-prospects, and white prospects are

more likely than non-prospects to come from schools with a higher percentage of certified teachers. Prospects are more likely to participate in sports/athletics than non-prospects. Prospects were more likely than non-prospects to cite finances as a reason for not attending PSE; however, prospects are more likely than non-prospects to have future educational plans.

Figure 37. Enlistment propensity and standardized test scores[a]



a. Source: Dr. Cathleen McHugh and Ms. Anita Hattiangadi, *Comparing the Socioeconomic Characteristics of Military Prospects and Non-Prospects,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

In a 1988 National Education Longitudinal Study following a class of 8th graders through to their senior year and beyond, research shows the following. Of those who said they would join the military, 64 percent served in the active-duty forces, 20 percent attended PSE, and 16 percent worked full- or part-time. Of those who said they would work full-time, 2 percent served in the active-duty forces, 32 percent attended PSE, and 66 percent worked full- or part-time. Research also

shows that actual enlistees are more likely to attend PSE than non-enlistees, and enlistees with some PSE earn more than non-enlistees. Dr. McHugh and Ms. Hattiangadi concluded by stating that they found no evidence that prospects are more disadvantaged than non-prospects. Their research did show that enlistees are more likely than non-enlistees to attend PSE, and enlistees with PSE earn about $3,000 more per year than non-enlistees.

Training and Fleet Performance

GENDET Cost, Attrition, and Career Opportunities

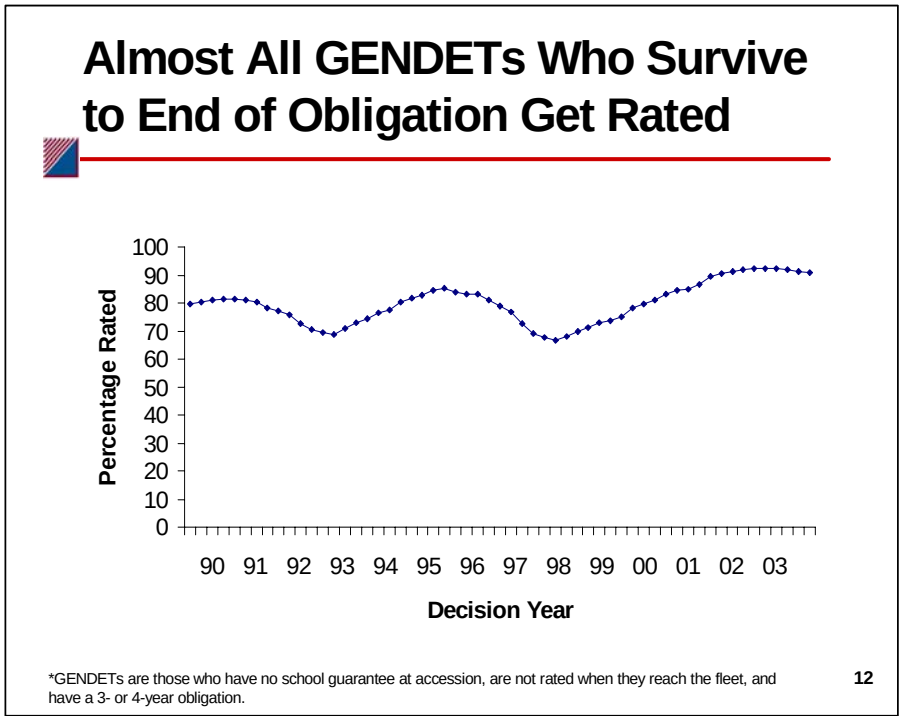
Late in CNO Clark's tenure, the Navy decided to phase General Detail Sailors, or GENDETs, out of its future workforce. Dr. Henry Griffis (CNA) made a presentation on analysis undertaken to counter misinformation that was floating around. Some of the assertions were that (1) GENDETs have almost 50 percent attrition, and fewer career opportunities, and (2) GENDETs cost the Navy $50,000 for each man-year delivered and, thus, are not a bargain. Although momentum was gained to reduce GENDETs in the past, the Navy is still considering the future role of GENDETs.

CNA's past research revealed that, since FY98, GENDETs are 19 to 25 percent of accessions. The entry program for GENDETs is low cost, with recruiting costs around $6,000 vs. $16,000 Navy-wide, and training costs around $7,000 vs. $27,000 Navy-wide. Researchers also found that attrition of GENDETs is slightly higher than that of other accessions, and GENDET recruits have lower average AFQT scores. The Navy provides good career opportunities to GENDETs, granting first-term ratings on average within 2 years. More than half of the Sailors who start as GENDETs earn ratings. Almost all who finish the first term get rated. Those who earn ratings in the first term tend to have higher reenlistment rates.

Dr. Griffis' research indicates that, in terms of requirements, there is no evidence that GENDET work has gone away. The real question is, "How many GENDETs are needed, and how should they be managed?" Analysts suggest keeping GENDETs (under a different name), and assigning and managing them as apprentices in selected ratings.

In addition, there is no evidence that GENDETs need training before reporting for work. Analysts suggest that it would be more cost-effective to begin training in the rating after GENDETs arrive in the fleet to avoid training waste due to decayed skills.

Figure 38. Opportunities for GENDETs who complete obligation terms[a]



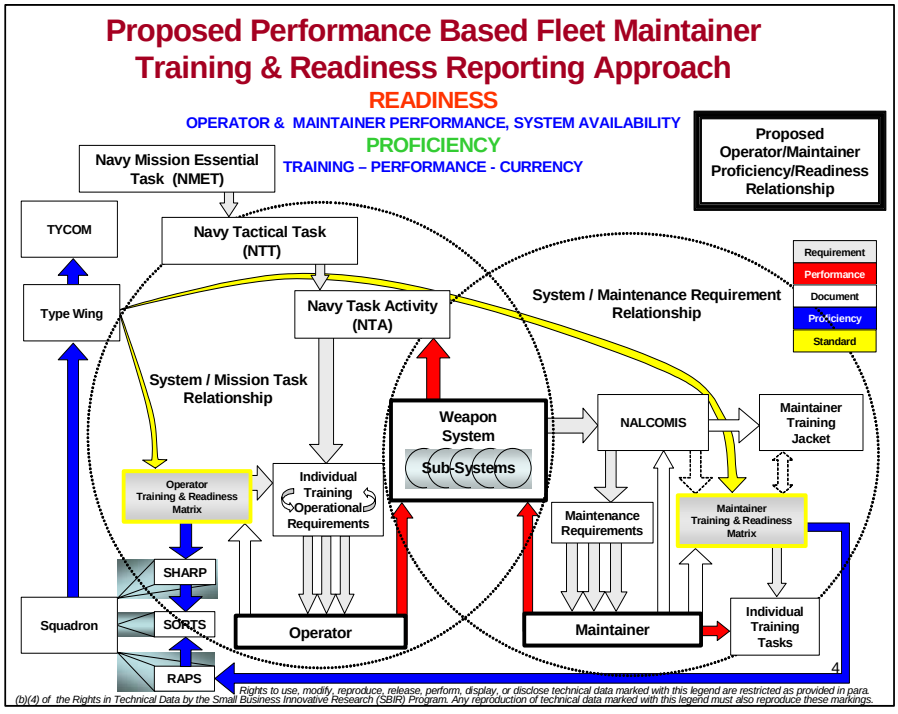
a. Source: Dr. Henry Griffis, *GENDET Cost, Attrition, and Career Opportunities,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Automating Readiness Assessment and Intelligent Scheduling for Performance-Based Total Force Training Readiness

Dr. Larry Keeler (NAVAIR) began the presentation stating that the road to Total Force Readiness must provide for Sailors imbued with and able to sustain performance-based training readiness. He contends that current methods for measuring and managing the Sailors' individual and collective training readiness requirements as a part of

the Navy workforce are inadequate. The elements of Dr. Keeler's proposed architecture follow: (1) links the warfighters' mission critical individual and collective job and training tasks to the unit and higher-level mission and operational tasks they support, (2) continuously assesses and reports individual, skill-group, unit, and higher-level training readiness metrics, and (3) optimally assigns job and training tasks for attaining and sustaining the required levels of job proficiency for performance-based training readiness.

Figure 39. An approach to performance based training readiness[a]



a. Source: Dr. Larry Keeler, *Automating Readiness Assessment and Intelligent Scheduling for Performance-Based Total Force Training Readiness,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Keeler's research team's approach uses newly defined data relationships, multiple-attribute utility theory, interval algebra, and fuzzy logic for modeling/assessing individual and unit-level training readiness; Kiviat displays for generating tailored visualizations of readiness; and heuristic rules in applying intelligent scheduling technology to

both training and work assignment in order to sustain optimal individual job proficiency in support of readiness. The research team also explores practical issues, such as automating data acquisition from multiple, disparate legacy data sources. Dr. Keeler also presented a roadmap for leveraging the existing prototype enabling technology to support future applications for assessing, attaining, and sustaining performance-based Total Force Readiness in the decades to come.

Filling the Gap in the Revolution in Training: Tracking, Predicting, and Evaluating Knowledge, Skills, Abilities, and Competencies

LCDR Matthew Swiergosz (HPC Detachment, Center for Explosive Ordnance Disposal and Diving) and Mr. Barry Pokrifcsak (Marquetta Sports Group) presented a research tool for assessing the performance of Sailors in the fleet. They believe that the Navy, to realize the full potential of the Revolution in Training (RIT), must be equipped with tools that enable efficient data acquisition and analysis of knowledge, skills, and abilities (KSAs) that define core and rate-specific competencies that will feed Navy Mission Essential Task Lists (NMETLs). The authors stated that a January 2006 CNA report (CRM D0013105.A2) highlighted deficiencies in the Navy infrastructure (e.g., disconnected or incomplete databases; missing or unreliable data; absence of tools) to adequately assess specific elements of performance. The successful implementation of corporate readiness tools currently under development (RCRP and DRRS-N) will require reliable and valid performance data feeding into these systems.

LCDR Swiergosz and Mr. Pokrifcsak also reported that an analysis of SPECWAR/SPECOPS accessions during FY06 by the HPC Detachment, Center for Explosive Ordnance Disposal and Diving, echoed the lack of a corporate infrastructure to support the acquisition, storage, and analysis of performance. The inefficient use of manpower for the manual generation of spreadsheets and custom reports within the accession and training processes prompted the recommendation of a Street-to-Fleet solution.

The research group contends that there are several pieces missing from current performance data systems. Control/Modification of templates should be delegated to the command that has oversight of

performance (e.g., CNRC = recruiting; Centers = learning sites, fleet assessment) to facilitate rapid adaptation to mission demands. One possibility is Skill Capacity by the Marquetta Sports Group. Skill Capacity software uses a template to identify and define skill sets, evaluate individual candidates, identify critical intangible qualities, and track key environmental and situational variables. The data are easily uploaded and synchronized to a targeted database. Data reports are created in real time. The researchers believe that this template-based tool could be used to increase effectiveness in the recruitment prequalification and mentoring processes, increase effectiveness and cost efficiency of ongoing training through accurate skills assessment and performance analysis, and fill the gap for reliable and valid feeds into readiness systems.

Figure 40. Performance data systems are missing critical pieces[a]

a. Source: LCDR Matthew Swiergosz and Mr. Barry Pokrifcsak, *Filling the Gap in the Revolution in Training (RIT): Tracking, Predicting, and Evaluating Knowledge, Skills, Abilities, and Competencies*, briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Seabee Readiness Model: Reporting Capability for Seabee Battalions

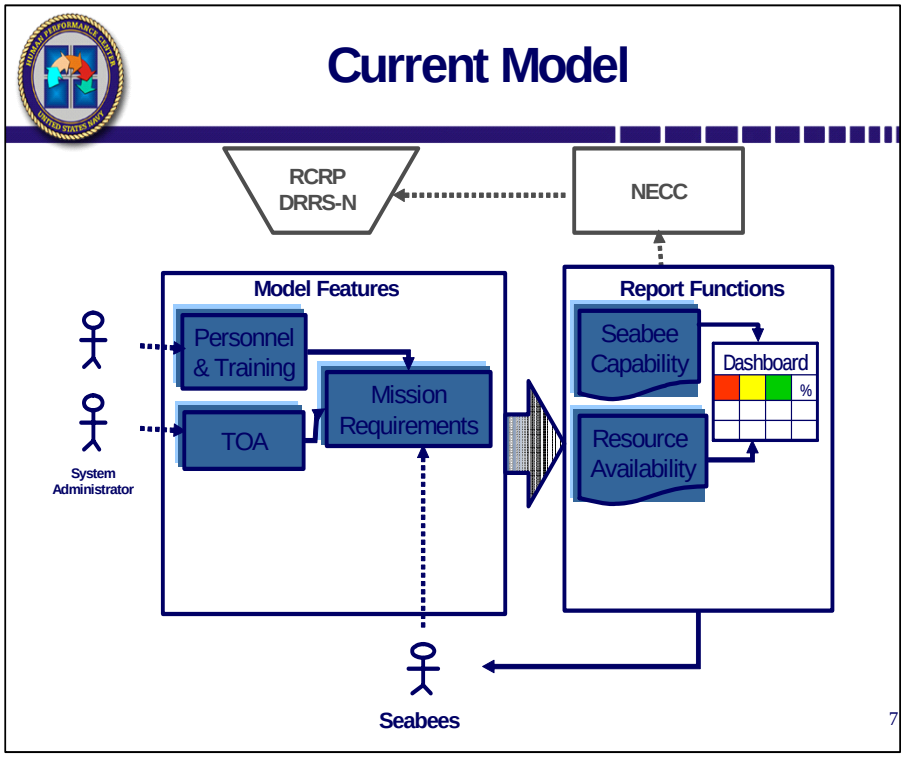
Ms. Amy Griffin of the Human Performance Center (HPC) and colleagues presented on the Seabee Readiness Model. With the increasing operational tempo of U.S. Navy Seabee Battalions, military leaders must rapidly evaluate battalion capability to execute a broad range of mission requirements. Current readiness reports provide military leaders with snapshots of resource inventories (personnel, equipment, and training statistics); however, mission planners apply diverse methods to combine components of these discrete reports in conjunction with their personal experiences to assess and execute mission requirements with minimal risk. The absence of a standard method to elucidate battalion readiness makes it more difficult to ascertain whether battalions in theatre or preparing for deployment are adequately manned, trained, and equipped. Although corporate readiness tools are under development (e.g., RCRP, DRRS-N), initial implementation of DRRS-N within the Seabee community is scheduled for a single battalion in August 2007, while full implementation across the Seabee workforce is unknown.

During the presentation, Ms. Griffin described the work completed in developing a readiness model that enhances the awareness of resource deficiencies prior to mission assumption and dynamically reports mission capability as a result of adjustments in mission planning, thereby allowing senior leadership to better plan and execute vital missions. The current model concept focuses on defining mission requirements (personnel and training, as well as the equipment or TOA) and comparing them with the SMART Battalion's available resources. Resource reports will be generated by the model reporting both Seabee Capability and Resource Availability. Reports will feed a dashboard view for high-level visibility and reporting. Reports and data tables will be used by the Naval Expeditionary Combat Command (NECC N8) to provide data for overall readiness reporting requirements (e.g., RCRP).

Ms. Griffin concluded by reiterating the benefits, which include aligning reporting methods, defining mission scope, and reporting capability for Seabee Battalions. Additional benefits include a human

performance improvement approach to validating mission requirements and optimizing resources. All related work supports the overarching goal of facilitating the transition to RCRP and DRRS-N for the Seabees. Other forces within the NECC enterprise may also benefit from these efforts. Ms. Griffin said that future versions of the model will incorporate such concepts as live data feeds from current and future Seabee databases and tools, mapping their NMETs to missions and resources, mission analysis for optimal resource requirements, and individual qualifications and readiness.

Figure 41. Current Seabee readiness model[a]



a. Source: Ms. Amy Griffin, *Seabee Readiness Model: Reporting Capability for Seabee Battalions,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Diversity

Keeping Successful Women in the U.S. Navy Surface Warfare Community: Is the Navy Losing in the War for Talent?

According to analysts Alice M. Crawford, Gail F. Thomas, Stephen L. Mehay (Naval Postgraduate School), and William R. Bowman (U.S. Naval Academy), research shows that retention rates for women Surface Warfare Officers (SWOs) are about half those for men (17 vs. 38 percent). The Surface Warfare Officer Continuation Pay (SWOCP) has not solved the problem. Increased operational requirements and the possibility of Individual Augmentation add to the threat of continued retention problems. Because this topic has been addressed by numerous other studies, the present study concentrated on "successful women," that is, those who are senior or have taken SWOCP.

Figure 42. Eight-year SWO retention rates, by gender (1988-1997)[a]

a. Source: Ms. Alice M. Crawford et al., *Keeping Successful Women in the U.S. Navy Surface Warfare Community: Is the Navy Losing in the War for Talent?* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

The analysts collected qualitative and quantitative data to get a clear picture of issues, and they examined concerns and practices related to professional women in Corporate America. The data collection process entailed interviews with 13 senior SWO women, including 8 of 11 women in command (past or present) and 5 of 9 selected for or slated to command. Focus groups or interviews were conducted with 44 women who opted for SWOCP and with 15 male SWOs plus 7 other men, including junior officer detailers, the senior detailer, the SWO community manager, and a fleet chaplain. Research reveals some key characteristics that are common among successful SWO women: they like to be challenged; they are passionate about their work; they are flexible, thick-skinned, and assertive; and they have had the support of mentors. In spite of their success, the women and men interviewed for this study have concerns similar to those who have resigned or intend to resign. The key factors are work-life imbalance, male/female communication and relational difficulties, operating schedule uncertainties, long hours, a rigid career path, lack of family considerations, low morale, poor leadership, and pervasive negative culture in the SWO community. The "push" to leave may be from Surface Warfare, not the Navy

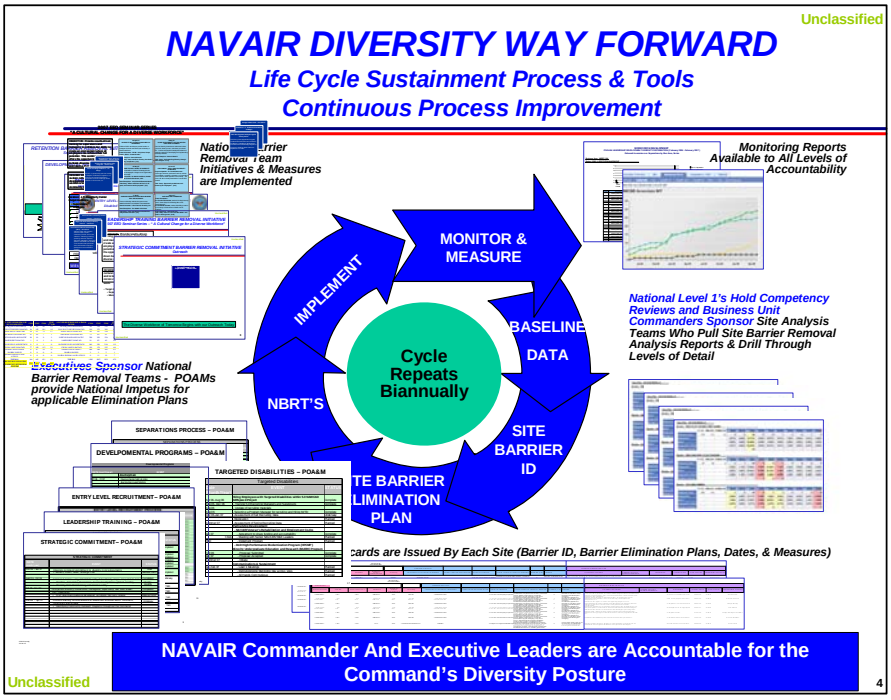
The researchers concluded that information collected for this study points to the need for improved leadership training (for both men and women), enhanced career flexibility, a menu of incentives to stay in Surface Warfare, improved communications at many levels, and-overall-top leadership involvement in a significant cultural change. The research was sponsored by The Chief of Naval Operations (Manpower Personnel Training and Education).

Diversity Life-Cycle Sustainment Process

Mr. Gary Kurtz (NAVAIR) began the discussion expressing NAVAIR's desire to be recognized as a leader in hiring and retaining a diverse workforce. NAVAIR's strategy is focused on building a diverse and proficient workforce that enables and sustains naval aviation enterprise mission success. Key features of the strategy are senior leadership commitment and accountability for metrics and results. NAVAIR has maintained its diversity posture through an era of job restructuring and workforce shaping.

According to Mr. Kurtz, NAVAIR has established the means to do effects-based workforce diversity management through its closed loop diversity sustainment process. The process entails the combination of several components that are helpful in building a diverse workforce. First, NAVAIR conducts analysis at each of its worksites to locate barriers and determine their causes. For example, analysis might help to determine why there is a lack of disabled veteran or female applicants at certain sites. NAVAIR then sets into motion focused action plans at both local and national levels.

Figure 43. Diversity Life-Cycle Sustainment Process[a]



a. Source: Mr. Gary Kurtz, *Diversity Life-Cycle Sustainment Process,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Diversity analysts believe that cultural change requires strong leadership. In another key component of the process, NAVAIR executives sponsor national barrier removal teams. NAVAIR has established a seminar series for leaders that is offered across all sites through the use of video teleconferencing (VTC) and video recording. NAVAIR

also recognizes the importance of a strong mentoring program. A NAVAIR executive-led Lean Six Sigma/AIRSpeed Green Belt Project has examined current NAVAIR military and civilian mentoring programs and also benchmarked industry mentoring programs. The Green Belt Project team is developing an expanded formal and informal mentoring program that is directed at both the military and the civilian workforce.

NAVAIR also uses many outreach programs that are representative of school and community outreach at various sites and business units. For example, the Personal Excellence Partnership (PEP) at Patuxent River received the Navy's 2006 Community Service of the Year Award for mentoring, tutoring, providing technical expertise, and, most important, serving as positive role models for students in southern Maryland. As a direct response to DoN's 2-percent Individuals with Targeted Disabilities Workforce Goal, NAVAIR leaders have accepted accountability for meeting this goal as part of a 5-year recruiting and accession program. NAVAIR has led the way in establishing an MOU with the Disabled Veterans Cooperative Education Programs—an opportunity to strengthen the knowledge and skills of veterans and build capable and proficient employees for the future.

Mr. Kurtz said that NAVAIR's retention barrier removal initiative seeks to increase NAVAIR command-wide knowledge of why employees voluntarily separate and to develop corresponding initiatives and metrics that will result in improved retention. NAVAIR's process operates with metrics-driven results monitoring, making many monitoring reports available to NAVAIR leadership. Reports show the diversity distributions and can be run by each senior leader level of accountability—National, Business Unit, or Competency and Aviation Program Executive Officer (PEO)—via the Digital Diversity Cockpit reporting tool. Each report provides on-boards, accessions, promotions, net gains and losses for NAVAIR civilian workforce or leadership pipeline for segments of the workforce.

In conclusion, Mr. Kurtz stated that, in alignment with the CNO's three phases of diversity (Assessment, Decisive Action, and Sustainment), NAVAIR has built a sustainable diversity strategy, closed-loop process, and enabling tools. NAVAIR strategies and process allow collaboration between all levels of NAVAIR leadership to improve

diversity results. Strategy, process, and leadership collaboration represents a clear expression of the NAVAIR commitment to value diversity in every aspect of the workforce.

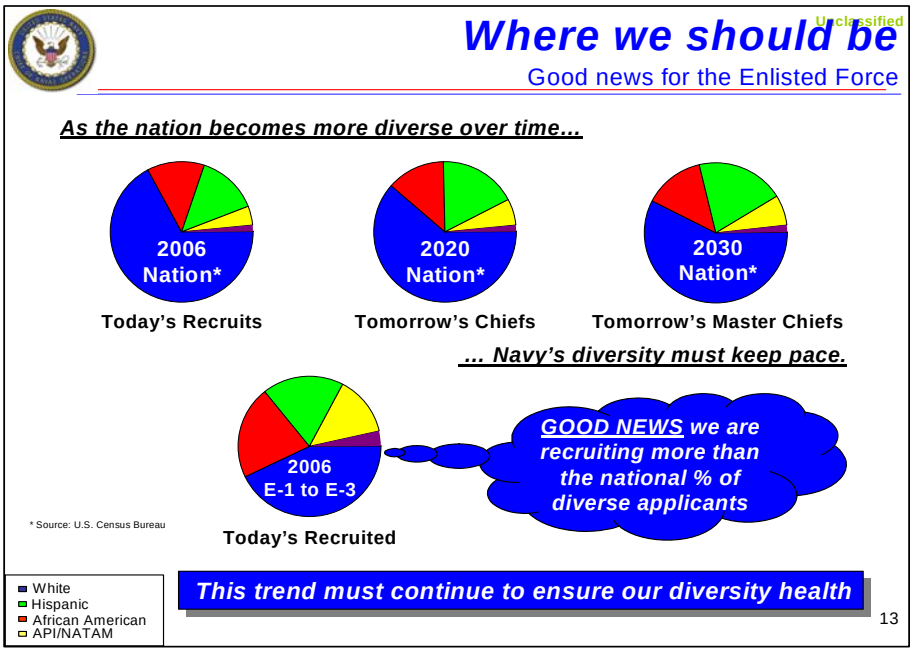
The Strategic Imperative of Diversity

CAPT Ken Barrett, U.S. Navy, Director of the Navy's Diversity Directorate (OPNAV N134), discussed the Navy's efforts to enhance the diversity of its military members, a Chief of Naval Operations (CNO) Top 5 priority. The CNO has stated that diversity is (1) a strategic imperative, (2) critical to mission accomplishment, and (3) a leadership issue. As CAPT Barrett explained, the Navy recognizes that the strength of our Nation, and our Navy, comes from diversity. The Navy wants to ensure that it has a force that represents the strength of that diversity, to recruit the strength of our Nation's diversity, and to have access to the Nation's talent. Demographic projections show that, by 2050, minority groups will make up half of the population.

CAPT Barrett explained that the Navy has failed historically to hold leadership accountable for diversity, increase minorities in technical ratings, mentor minority officers, implement career-long diversity training, and support internal affinity groups, such as the National Naval Officers Association (NNOA) and the Association of Naval Services Officers (ANSO). The Navy developed a Concept of Operations (CONOPS) to address these issues, creating a three-phased approach: Phase 1, Assessment; Phase 2, Decisive Action; and Phase 3, Sustainment and Accountability. This approach will be used to move the Navy from "words to action." The desired end state is to develop an institutional framework that maintains a diverse total force, through enduring effects-based assessments.

The Navy "took a fix" in Phase 1, capturing a snapshot of its diversity strengths and weaknesses. In Phase 2, it took decisive action, establishing a weekly strategic working group to engage the enterprises/communities, to solicit input and feedback, to conduct root cause analysis, and to share best practices. In December 2006, the Navy entered Phase 3 and established five action areas: developing metrics and accountability procedures, improving outreach, implementing mentoring, revamping training, and communicating the message.

Figure 44. The Navy's diversity goal is to keep pace with the Nation[a]



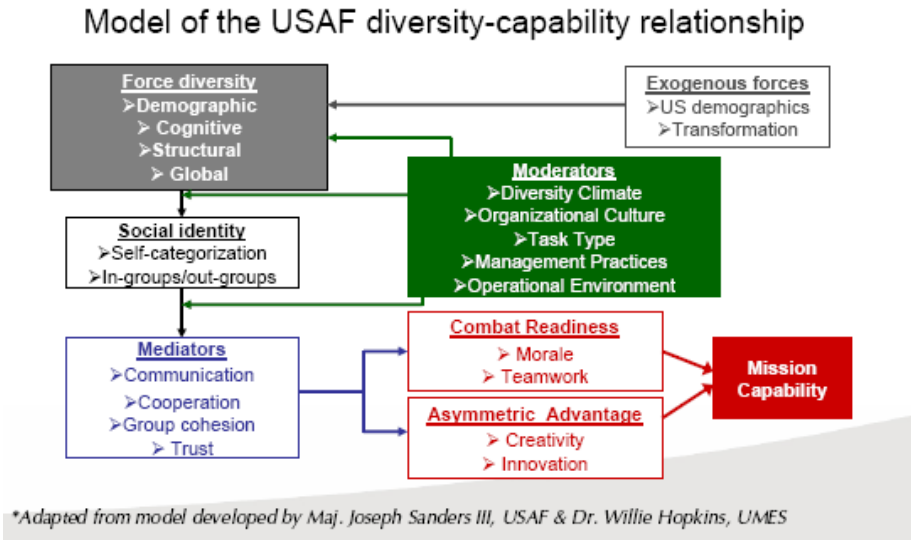
a. Source: CAPT Ken Barrett, *The Strategic Imperative of Diversity,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

CAPT Barrett concluded the presentation by discussing the specifics of how the Navy plan will be implemented. He discussed the CNO accountability reviews where enterprise and community leads will brief the CNO on their diversity health. Further, the desire to build a mentoring continuum to ensure that the Navy retains its talent was discussed. Through enterprise/community accountability and mentoring, the Navy will ensure that talent is promoted and retained. Metrics have been developed for enterprise leads to capture their diversity health, to identify shortfalls, and to plan the way ahead. In addition, outreach efforts are moving from episodic to sustained diversity engagement with K-8 programs, pre-college initiatives, college affinity groups, and national affinity groups. Finally, through training and communication, the Navy will ensure that a coherent, consistent, and compelling diversity message is delivered to both internal and external audiences.

Impact of Diversity on Air Force Mission Performance

CNA researchers Dr. Amanda N. Kraus, Dr. April K. Hodari, Dr. Martha Farnsworth Riche, and Dr. Jennie W. Wenger presented the analysis from a diversity study based on structured interviews with recently deployed servicemembers. The overall task was to study the impact of diversity during deployment. The analysts' strategy involved understanding the relationship between force diversity and mission capability in U.S. Air Force (USAF) contexts to answer several key questions. First, where does diversity matter? That is, at what organizational level and for what types of tasks and decisions? Also, how does diversity matter? What mediating and moderating factors are important for the AF, and how can they be measured? Second, the analysts identified specific goals associated with diversity. Finally, they examined how to design policies to achieve the goals. The research framework was based on a model of the USAF diversity-capability relationship and the components of force diversity, social identity, mediators, moderators, combat readiness, asymmetric advantage, and exogenous forces, which lead to mission capability.

Figure 45. Research framework—based on USAF model[a]



a. Source: Dr. Amanda Kraus et al., *Impact of Diversity on Air Force Mission Performance,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Kraus' team addressed the issue of the role of diversity as a determinant of performance in the combat environment based on the respondents' perceptions of the impact of four types of diversity on team productivity. Research also addressed the role of diversity management as a moderator by examining the respondents' evaluations of how their own skills, knowledge, and experiences (SKEs) affected their abilities to use diversity to enhance mission capability, and respondents' ideas about the SKEs that would have improved the use of diversity to enhance mission capability.

The four dimensions of diversity associated with SKEs were demographic, cognitive, structural, and global. The coding process was designed to minimize researcher bias, allow for coder team consensus/arbitration, and calibration. Each dimension was rated on its impact with respect to positive and negative group dynamics (i.e., relational and communication factors) and facilitation or impediment to mission accomplishment (i.e., problem solving and adaptation to foreign environments). Respondents' perceptions about diversity were both positive and negative. In some situations, diversity interactions were comfortable, diversity added value, and diversity was managed well, but in other situations it was not.

Dr. Kraus' team made the following recommendations. First, review current management training curricula and leadership guidance to see where diversity-specific elements can or should be integrated. Second, develop more nuanced predeployment cultural sensitivity training to help prepare troops for the difficulties of being deployed in foreign environments. Third, develop training exercises and programs to improve total force integration, including more education about the different management structures for the AC and the RC. Fourth, develop training exercises to allow servicemembers to practice operating in functionally diverse groups with unfamiliar members. Finally, explore ways to expose more people to working in joint settings and to provide this experience at earlier stages in both enlisted and officer careers.

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Research Presentations: Session IV

Managing Personnel Safety

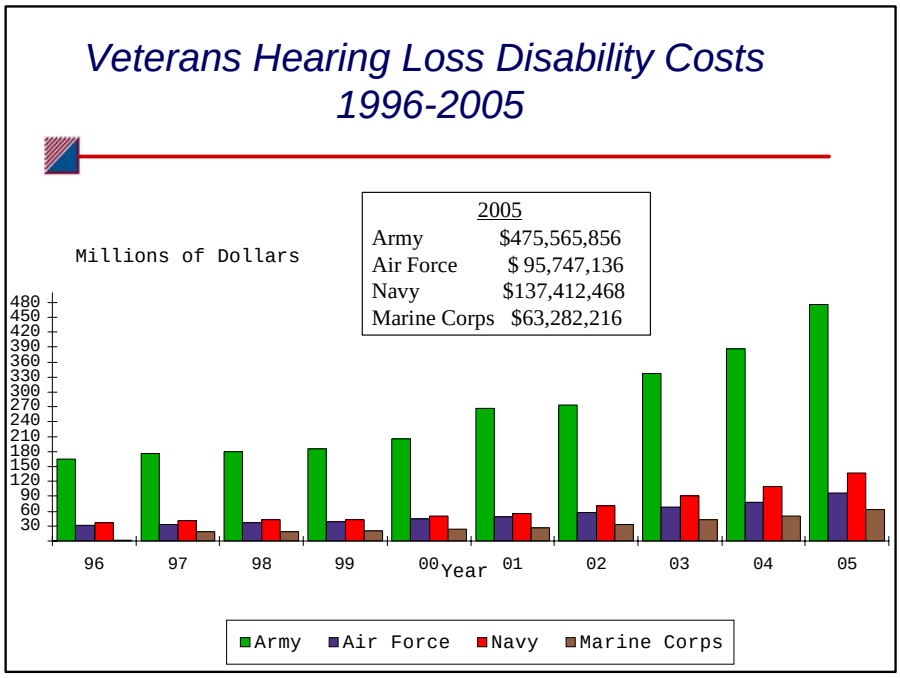
Computing the Return on Noise Reduction Investments: A Life-Cycle-Cost Approach

Dr. Robert Trost (CNA) began the presentation by stating that the DoN hearing loss costs continue to escalate. Research conducted with Mr. Geoffrey Shaw (CNA) found that in FY 2005 the Veterans Administration (VA) paid $137 million to more than 18,000 DoN veterans with hearing loss. Close to half of Sailors who complete a career have some measurable hearing loss. In addition, noise on ships may have a detrimental impact on morale, and a consequent effect on reenlistment rates. The Deputy Assistant Secretary of the Navy (Safety) asked CNA to analyze the factors that influence hearing loss rates among Sailors, evaluate the long-term costs, and help identify strategies to reduce these rates. The study was intended (a) to help the DoN address the escalating costs of noise and hearing loss by developing a life-cycle-cost model of noise on a Navy platform, and (b) to show how to apply the technique to the LHD Navy ship platform.

The model developed by Dr. Trost's team allows the Navy to compute the return on investment of noise reduction methods for either an entire platform or individual hazardous noise spaces on the ship. A user-friendly prototype calculator Excel "tool" is included as a deliverable from the study. The team points out that, as impressive as the 15:1 to 17:1 return on investment from noise abatement engineering methods estimated in this report is, there are many benefits that are not accounted for in the model, such as the impact on personnel morale, life quality, and mission capability. Moreover, they have found that, theoretically speaking, costs of noise mitigation methods should be sub-additive because of economies of scale, and benefits may be super-additive if methods applied to adjacent sites complement each

other. Therefore, it is more than likely that the actual rates of returns for the whole platform are even higher than the ones estimated in this report.

Figure 46. Medical costs for veteran hearing loss disabilities[a]



a. Source: Dr. Robert Trost and Mr. Geoffrey Shaw, *Computing the Return on Noise Reduction Investments: A Life-Cycle-Cost Approach,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Based on results from the Excel calculator tool developed in their research, they recommend the following:

- The Navy should adopt a tool such as the one developed in the paper to evaluate all hazardous sites on Navy ships (not just the hazards for noise).
- The program managers of Navy ships should provide the necessary data to evaluate and prioritize noise abatement methods on their platforms.

- The Navy should allocate resources to improve and update the prototype calculator tool developed in the paper. Data can be used to further refine the parameter specification and functional forms outlined in this report and built into the Excel calculator tool.

These recommendations of applying, refining, and further developing user-friendly calculator tools for noise and other hazardous situations should help both the U.S. Navy and the U. S. Government save money by reducing the life-cycle cost of various Navy platforms.

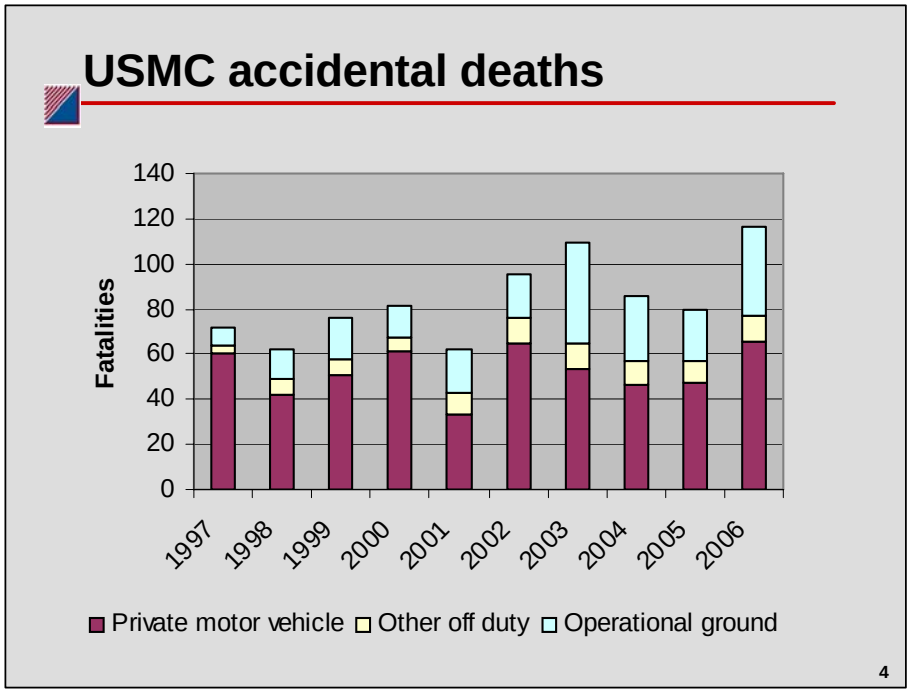
Statistical Analysis of USMC Accidental Deaths

Dr. Michael Bowes and Dr. Brent Boning presented a study on the statistical analysis of accidental deaths in the USMC. A sharp increase in deaths in 2002 triggered the concerns that led to this study. According to Dr. Boning, however, the issue is more general. Analysts want to study why Marine fatality rates run about twice as high as those for the Navy. The following figure presents statistics for accidental deaths among Marine Corps military personnel—not considering aviation accidents or combat-related deaths—but this does include accidents during operations. Private-vehicle-related deaths are separated out. These usually account for most of the fatalities. There is a gap in understanding the fatalities. Although there are lots of broad safety statistics and detailed analyses of specific mishaps, there is little knowledge of systematic risk factors. The objectives of current research include identifying individual risk factors associated with accidental death and types of risk factors (personal characteristics, career events, etc.). The analysts also seek to provide a basis for safety programs focused on individuals most at risk.

In their approach, the analysts used a statistical method known as survival analysis to identify risk factors associated with accidental death. This is a standard technique in the medical literature, where it's used to evaluate the effectiveness of treatment, or in the industrial engineering literature. The key is to look at the conditional probability of the event occurring, given that it hasn't happened yet. This is different from the maximum likelihood probit, where it is the unconditional probability of an event occurring. Researchers used data and information on all Marines who served from mid-1996 through early

2003. The data were available in quarterly observations on career events and personal characteristics taken from individual personnel records archived at CNA. The data cover about 450,000 Marines, 5 million quarterly observations, with about 500 deaths among them. The data include observations on both fatalities and non-fatalities. Observations involving non-fatalities were used as the control group.

Figure 47. Accidental deaths among Marines are rising[a]



a. Source: Dr. Brent Boning and Dr. Michael Bowes, *Statistical Analysis of USMC Accidental Deaths,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Boning presented some statistically significant results that may be interpreted as relative risk compared to a baseline group. In terms of basic demographics, it is not too surprising that men have higher risk. There is a strong relationship between race or ethnicity and risk. Age is also a primary risk factor because risk declines with age. More focused risk groups are identified as follows. First, Marines in the

early part of their career (in fact, during the last half of their first year) are at twice the risk of death as at later times. Second, recent demotion is a significant risk factor. Next, postdeployment, the period after deployment, is associated with substantial risk of fatality (it's even more pronounced when we looked at vehicle fatalities alone). Also, various mechanics and engineers have high risk of accidental death relative to other occupations. Individuals who reported a history of drug use, traffic violations, or other serious offenses before enlistment have a 60- to 80-percent increase in risk. Finally, Marines based in rural areas face a 25-percent greater risk than those in urban areas.

In conclusion, Dr. Boning stated that overall, Marine vehicle fatality rates are actually a little lower than those for the equivalent civilian population. He said that the most striking feature of these data is the unusually high death rate for Marines in the morning rush hours of 0500 to 0759. The rates are significantly above those of civilians during the same hours.

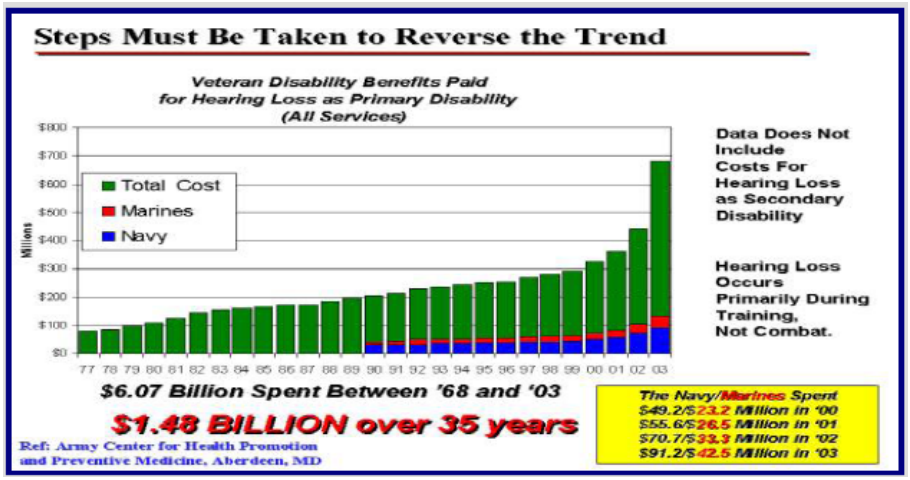
Executive Overview: U.S. Navy's Acquisition Safety Website

Ms. Joy Erdman (OPNAV Safety Liaison Office) presented an overview of the Navy's acquisition safety efforts, with emphasis on the Navy Acquisition Safety website. The goal for acquisition safety in the Navy is to save money by reduced mishaps and increased productivity through effective integration of safety throughout the acquisition process. The website's primary focus is on ships because this where the greatest safety risks are, but there are also numerous examples for aircraft and weapon systems.

The acquisition safety website addresses ten hazard areas with significant safety problems that need to be solved. Examples included high noise levels that lead to increased costs in terms of military hearing loss ($150M/yr +), and excessive vibration that can eventually cause gangrenous fingers. Some safety areas of greatest concern are Noise Ergonomics and Human Factors Engineering (HFE), Fall Protection, Confined Space Entry, Hazardous Energy (including Electrical), Heat Stress, Laser Safety, Nanotechnology Safety, Radio Frequency Radiation, and Ventilation. Numerous solutions were outlined, such

as vibration engineering controls in hovercraft, engineering noise control in aircraft exhaust nozzles, ergonomics improvements in ship equipment, fall protection engineering throughout ships, and elimination of need to enter confined spaces by remote controls.

Figure 48. Trend in veteran disability benefits paid for hearing loss [a]



a. Source: Ms. Joy Erdman, *Executive Overview: U.S. Navy's Acquisition Safety Website,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Ms. Erdman's presentation indicated that system safety is one method for identifying and addressing potential hazards during the design process. It allows for managing safety threats and provides a means for tracking and resolving potential hazards and reducing hazards overlooked during design process. The best time to integrate safety is at the beginning of the acquisition process. Research shows that early investment ensures reduction of Total Ownership Cost (TOC) throughout the life of the ship, aircraft, and weapon system.

In summary, Ms. Erdman concluded that safer ships will help military recruiting, improve military retention, increase productivity, improve warfighter capability, and provide a military competitive advantage, as well as save money. Finally, design is the future for Safety.

To view many of the slides used for the presentation, see: http://www.safetycenter.navy.mil/acquisition/executive_overview/Acquisition_Safety_Executive_Overview.pdf. The full acquisition safety website, including the 10 hazard areas can be access at http://www.safetycenter.navy.mil/acquisition/.

Compensation

Effect of SRBs on the Length of Reenlistment in the Navy

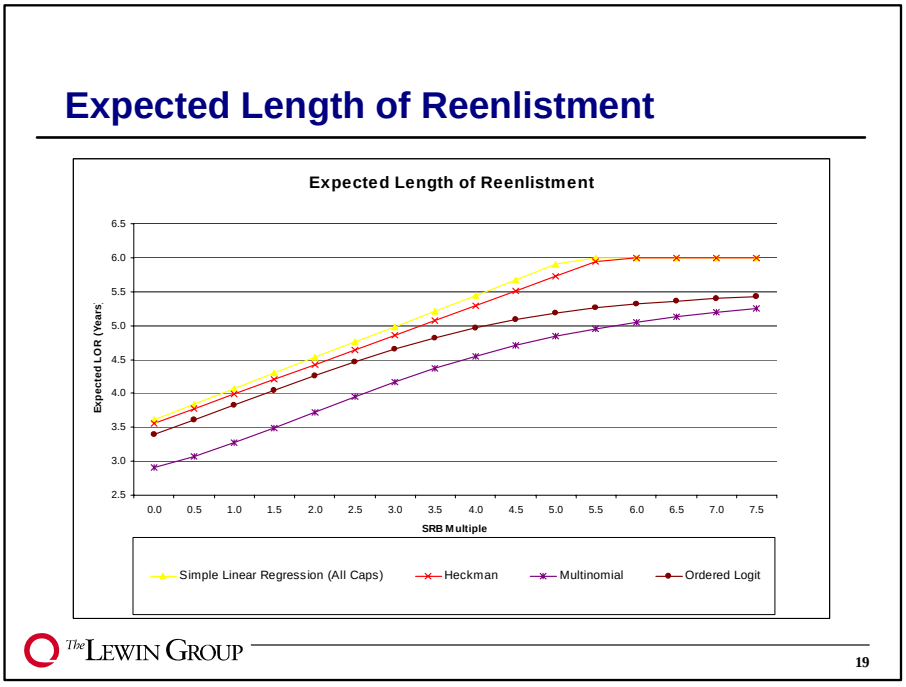
Mr. Paul F. Hogan and Mr. Brian Simonson (The Lewin Group) presented the results of research in which they estimate the effect of selective reenlistment bonuses (SRBs) on the choice of reenlistment contract lengths in the Navy. The researchers describe the empirical basis for the behavioral parameters in the SRB Bonus Management System used to predict reenlistment length. According to Mr. Hogan, reenlistment bonuses may be offered to occupation groups in the service where it is desirable to improve retention. The SRB increases the probability that a Sailor will reenlist, but it will also affect the reenlistment contract length chosen. The study's purpose is to help the Navy manage its SRB program efficiently by systematically providing estimates of the effect of a given SRB plan on the length of reenlistment (LOR).

Mr. Hogan and Mr. Simonson estimated the effect of SRB on the choice of contract length using Navy data. The bonus paid is a function of the multiplier, chosen by the Navy, the member's basic pay at the time of reenlistment, and the number of years (from 3 to 6) for which the member chooses to obligate. Several alternative functional forms and specifications are estimated, including those which control for selection bias. They estimated four models that are plausible for modeling choice of LOR: a Linear Ordinary Least Squares (OLS) model, a Heckman Two-Step Selection model, a Maximum Likelihood Multinomial Logit model, and a Multinomial Ordered Logit model.

In the OLS model, the researchers observed the reenlistment lengths only for those who reenlist. However, the LOR chosen by the bonus-induced reenlistment population may not be the same as for those

who would have reenlisted regardless of the bonus, which may result in overstating the average effect of bonuses on reenlistment length. To correct for this potential selection effect, the researchers estimated a Heckman Two-Step Selection model. The multinomial procedure estimates the relative probabilities of multiple discrete choices, or outcomes, as a function of a set of independent variables. Unlike the multinomial logit model, the multinomial ordered logit model treats values of the dependent variable as rank-ordered.

Figure 49. Results on the effect of SRB produced by four models[a]



a. Source: Mr. Paul Hogan and Brian Simonson, *Navy SRB Effect on Length of Reenlistment;* Briefing presentation for the Seventh Annual Navy Research and Analysis Conference, 2007.

The research team's results and predictions from the alternative estimation specifications for all four models are very close and imply similar LOR effects with regard to the effect of SRB on contract length choice. In particular, higher bonus multiples increase reenlistment length, while a binding ceiling on the payment of SRB reduces reenlistment length. The overall and marginal effects of the bonus on

LOR in the Heckman model are less than overall and marginal effects in the OLS model. The OLS model may overstate the effect of bonuses on reenlistment length because it imputes LOR for those induced to reenlist based on the reenlistment choices of those who would have reenlisted regardless of the bonus increase. The effect of the bonus on LOR was the smallest for the ordered logit model. The linear OLS model is most easily incorporated into the management model. Mr. Hogan concluded by saying that the effect of SRB on reenlistment is important because it permits better prediction of the budget cost of an SRB program, and because additional obligated staff years are an important benefit of higher SRB multiples.

Innovations in Retention Bonuses

The research presented by Dr. William R. Gates (NPS) and Dr. Peter J. Coughlan (NPS) looks at the bonuses used to retain naval officers; while we focus on officers, these results are easily extended to enlisted Sailors. These bonuses are beyond normal base pay and allowances (housing and subsistence), and the nonmonetary benefits to which all naval officers are entitled (healthcare and services, such as commissary). The goal is to find a retention bonus scheme that is efficient, cost-effective, equitable, and practical. *Efficiency* involves retaining the right number of the officers most willing to continue service; *cost-effectiveness* requires minimizing bonus payments; *equity* can mean either equalizing payments over all similar retained officers or equalizing economic rent over similar retained officers; *practicality* entails conforming to time and accessibility constraints.

According to Dr. Gates and Dr. Coughlan, an auction has the potential to set the appropriate price in the absence of market prices (markets require several buyers and sellers operating at an arm's length relationship). In particular, reverse auctions involve multiple sellers and a single buyer; officers sell their employment services to a single employer, the DoN. With a reverse auction, bidders (sellers) compete by offering lower prices; the winner(s) is the bidder(s) offering the lowest price(s). A reverse auction is the appropriate format in this case.

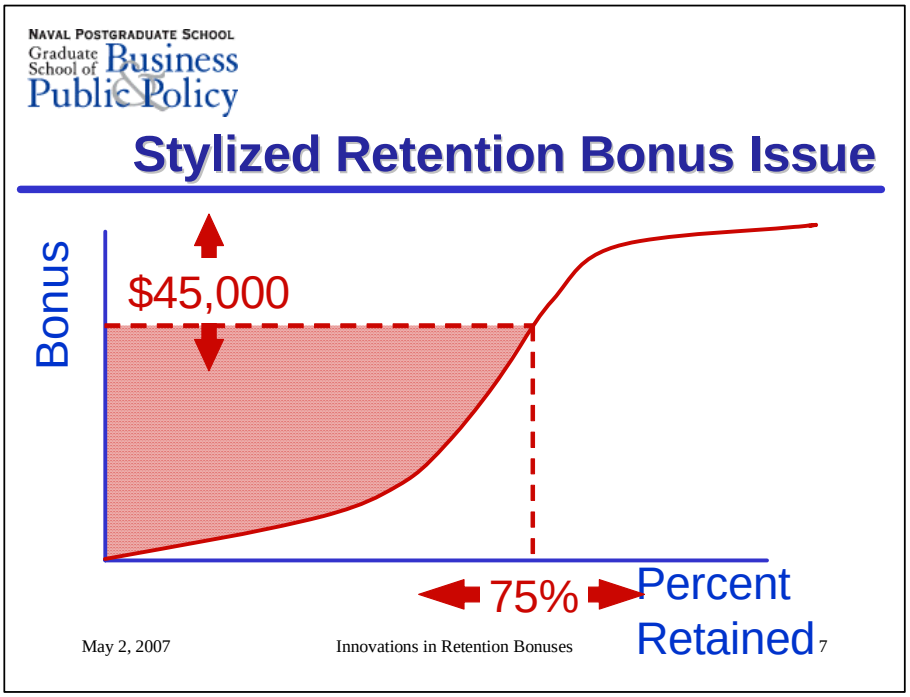
There are two general categories of reverse auctions: open/sequential and sealed/simultaneous auctions. In open/sequential auctions, bidders successively submit lower bids as they observe the bids of other participants. In sealed/simultaneous auctions, bidders submit one bid; all bids are revealed simultaneously to determine the winner. Practicality dictates that a retention bonus auction should be sealed/simultaneous. It is impractical to expect active duty officers to continuously track an open/sequential bid auction. As a result, attention here will focus on sealed/simultaneous auctions.

Dr. Gates believes that traditional reverse auctions are efficient and retain those officers most willing to serve. However, they are not particularly cost-effective, transferring significant surplus value to the retained officers at the Navy's expense. This research draws on the signaling literature to design a Sequential Self-Selecting Auction Mechanism (S3AM) in which it is optimal for bidders to signal their willingness to retain. We use willingness to make short- and long-term retention commitments as a signal for the opportunity cost of military service. Those most willing to retain will accept a relatively low bonus in exchange for a guaranteed long-term commitment; those less willing to retain will require a larger bonus for a short-term commitment (and an even higher bonus for a long-term commitment). If there is uncertainty about future retention bonuses or the probability of being retained (downsizing), those more willing to commit would prefer a smaller guaranteed annual long-term bonus to a larger 1-year bonus.

Dr. Gates and Dr. Coughlan used S3AM to illustrate. Suppose the Navy offers officers a choice between a 1-year bonus at $45,000 and a guaranteed 5-year annual bonus at $30,000/year. Also suppose officers accepting the 1-year option face a 50-percent probability of receiving a future 1-year bonus, reflecting that the force structure is a pyramid. We can calculate that the breakeven opportunity cost of military service is $20,510. Any risk-neutral officer with a lower opportunity cost of military service would accept a 5-year commitment; any officer with an opportunity cost of military service above $20,520 but less than $45,000 would accept a 1-year commitment. Simulation indicates that S3AM will transfer 15 to 20 percent of the surplus value back to the Navy, increasing cost-effectiveness. If officers are risk

averse, they will reduce their 5-year guaranteed bids below the risk-neutral breakeven value (sacrifice expected value to avoid the risk of not receiving follow-on bonuses). This would increase the surplus value that S3AM transfers back to the Navy.

Figure 50. Percentage of force retained increases with retention bonus[a]



a. Source: Dr. William Gates and Dr. Peter Coughlan, *Innovations in Retention Bonuses,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Matching Mechanisms for Assignment Incentive Pay: Theory and Simulation

Dr. Peter J. Coughlan (NPS) and Dr. William R. Gates (NPS) began their presentation stating that the U.S. Navy has introduced Assignment Incentive Pay (AIP) to deal with recurrent manning shortages in certain billets. Under AIP, selected Sailors receive the monthly bonus pay they requested for the duration of their tours in hard-to-fill, AIP-eligible billets. The AIP Program has been implemented

using an auction system that is thought to be a cost-effective means of getting Sailors to voluntarily accept assignment to hard-to-fill billets. AIP rates can vary for individual billets and depend on the Sailors' bidding behavior, which in turn is affected by Sailors' preferences and alternatives, as well as the bidding system structure and its implementation.

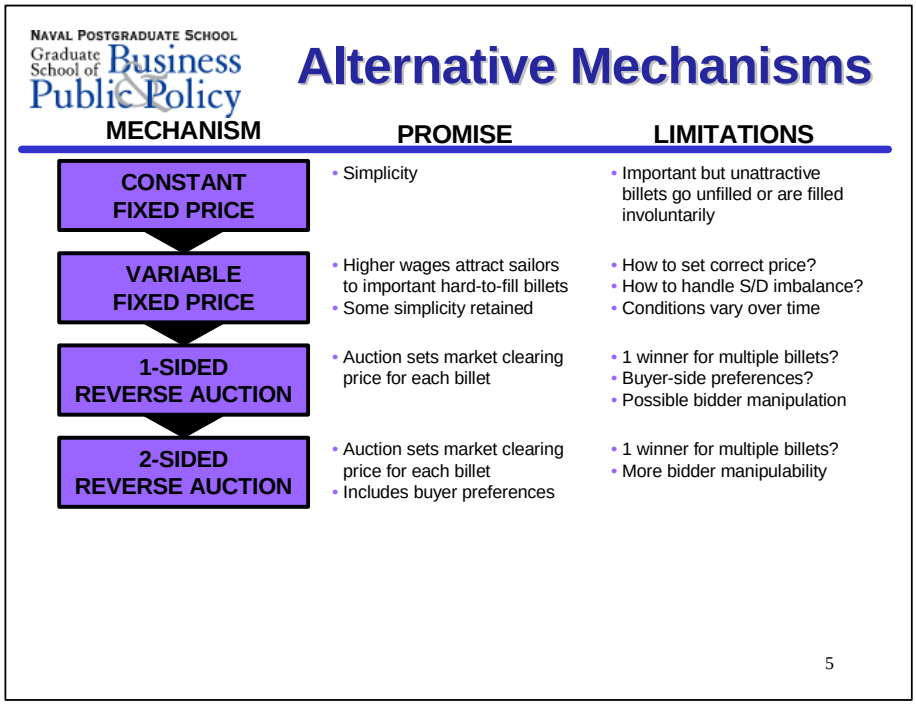
According to Dr. Coughlan, traditional auction theory provides little insight into the Sailors' bidding behavior in the AIP auction. Traditional auctions are one-sided matching mechanisms; the bidders care about the characteristics of the item being auctioned but the bid-taker doesn't care about the bidders' characteristics—only about the price offered. Job assignments are better characterized as two-sided matches; employees care about the job's characteristics, including salary, and the employers care about the job-seekers' characteristics.

If a quality or other goodness-of-fit variable is included in selecting the winning bidder, along with the bid value, high-quality bidders have an incentive to maximize their personal surplus by submitting a higher bid than their true valuation for the post. The auction is further complicated if the same Sailor can be the low cost bidder for more than one assignment. Experiments conducted by NPRST, while not exactly replicating the current AIP auction, indicate that the experimental subjects strategically manipulated their bids as their fitness for the job increased, increasing the Navy's AIP costs.

Dr. Coughlan's and Dr. Gates' research proposes an alternative auction mechanism that combines elements of both auction theory and matching theory to overcome these complications and potentially reduce DoD's cost. Matching theory focuses on trading multiple unique items between sellers and buyers, both of whom have preferences regarding their trading partner. Under the proposed alternative auction mechanism, bidders or servicemembers submit their incentive pay bid, which is their reservation wage or minimum willingness-to-accept (WTA) for each post. Individual servicemembers may have multiple preferred posts, which is reflected in their bids. The bid-taker, or employer, is also required to identify the reservation price or maximum willingness-to-pay (WTP) for each post to be filled. The value of having a Sailor man the billet depends on the fitness or

qualifications of the Sailor. To incorporate employer preferences fully, the employer can be asked to identify the maximum WTP for each billet and category of Sailor that can fill the billet, starting from the category with the lowest acceptable qualifications. If additional qualifications above and beyond the billet's minimum standard requirements significantly affect employer preferences, this is reflected in the employers' WTP.

Figure 51. Various alternative auction mechanisms.[a]



a. Source: Dr. Peter Coughlan and Dr. William Gates, *Matching Mechanisms for Assignment Incentive Pay: Theory and Simulation,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Coughlan and Dr. Gates found that using a simulation model, the modified auction mechanism, was feasible; it produced a workable solution consistently and easily. Although it was not efficient per se, the economic inefficiency is small. The mechanism generated an average match rate of over 95 percent, filling billets with qualified

Sailors, above the 85th percentile on average. Moreover, the Sailor-Optimal mechanism generated an equilibrium solution in which Sailors all prefer their final assignment over all others, while billets are basically indifferent among all Sailors given the final assignments and AIP levels. The Billet-Optimal model generates a symmetric result, in which billets prefer their final assignment and Sailors are indifferent. Laboratory experiments will be conducted to determine if Sailors and billets understand how to use the mechanism as well as whether and to what extent they will engage in gaming or deception. This mechanism offers the opportunity to significantly increase cost-effectiveness in the Navy's AIP program.

Quality of Life

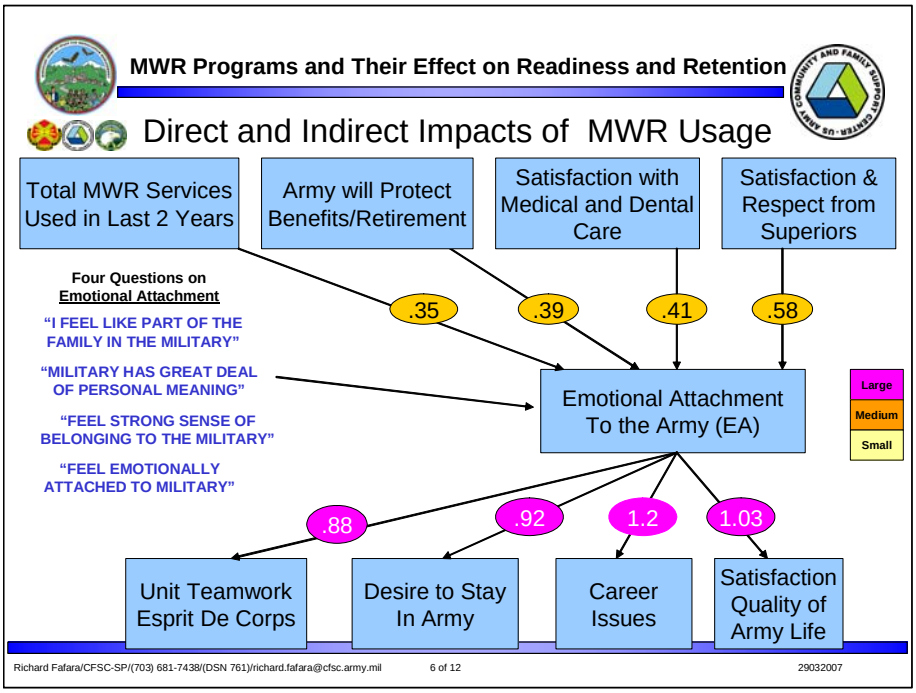
Linkage between Morale, Welfare and Recreation (MWR) Programs and Mission

Dr. Dave Westhuis (Indiana University) and Dr. Richard Fafara (U.S. Army Family and Morale, Welfare and Recreation (FMWR)) presented a study on quality of life that may also pertain to research that will help the Navy in achieving the 2025 Total Force. The briefing presents the results of a recently completed analysis of Army-wide Soldier data from the spring 2005 Sample Survey of Military Personnel (SSMP). The purpose of the analysis was to determine if statistical significance exists between "MWR use" and the desire to stay in the Army. Researchers identified links and measured the strength (effect size) of any associations. Effect size was found to be important because it shows the strength of the relationship between two statistically significant variables.

Dr. Westhuis' results indicated that the use of MWR programs has a strong, positive effect on Soldier emotional attachment to the Army, which, in turn, has a strong positive effect on both retention and satisfaction with the quality of Army life. Emotional attachments through MWR had a large direct or indirect impact on career issues, satisfaction with the quality of Army life, desire to stay in the Army, and unit teamwork esprit de corps. The use of MWR was also found to have a medium positive, direct effect on retention. He said it was

also found that increased use of MWR strengthens the effect size on emotional attachment to the Army, which has a large effect size on the Soldier's desire to stay in the Army. Dr. Westhuis plans to conduct additional analyses to replicate and validate these findings, evaluate other key variables with more precision, and study subgroups of MWR services, such as leisure time activities and youth services.

Figure 52. Measurement of "effect size" and emotional attachment to the Army[a]



a. Source: Dr. Dave Westhuis and Dr. Richard Fafara, *Linkage Between Morale, Welfare and Recreation (MWR) Programs and Mission,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

2006 Navy Spouse Survey

Navy N135 is responsible for policy and program oversight of Quality of Life (QOL) and Personal and Family Readiness (PFR) issues. Dr. Rosemary Schultz (NPRST), Dr. Paul Rosenfeld (NPRST), and Ms. Zannette Uriell (NPRST) presented the results of the 2006 Navy

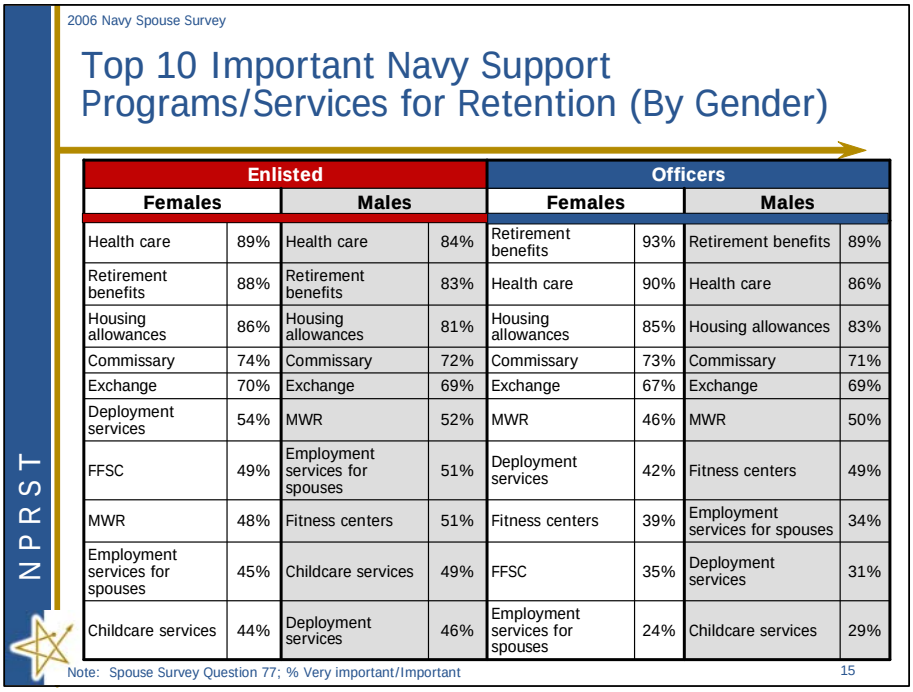
Spouse Survey, which will assist with evaluation of spouse/family needs for program delivery as part of policy and oversight responsibilities. The survey, administered from August 7 to October 13, 2006, had a 24-percent return rate (4,309 out of 17,908). Research results were statistically weighted by paygrade and gender to match a Navy-wide population. Dr. Schultz's briefing focuses on enlisted/officer breakouts with gender results included where appropriate. When gender results are presented, results are sorted by female enlisted responses since they are the largest group. Various components of Navy life were examined in the study, such as Navy Command to Navy spouse interactions/support, spousal employment opportunities, childcare and family support, and marital happiness.

According to Dr. Schultz, research indicates that, overall, interactions between the Navy and Navy spouses are positive. The 2006 QOL Survey of servicemembers found that 51 percent of enlisted and 78 percent of officer spouses indicated that they were satisfied with Navy life. In fact, the survey's top three most important Navy support programs for retention were (1) healthcare, (2) retirement, and (3) housing allowances. In 1999, the DMDC Navy Spouse Survey showed that 58 percent of spouses favored staying in the Navy. The 2006 survey showed an increase to 63 percent and 67 percent for enlisted and officers, respectively. Command-sponsored activities were also rated positively. More than three-fourths of all spouses had at least one command activity during deployment. Ombudsman, family social events, and spouse support groups were among the top three activities. Spouses of officers ranked the amount of Navy support and communication with families during deployment higher than enlisted servicemembers did. According to the survey, 59 percent of spouses of enlisted members and 81 percent of spouses of officers say their families were prepared or very prepared for the most recent deployment.

Dr. Schultz's results from the 2006 survey showed that 17 percent (up from 10 percent in 2002) of spouses said they were "very comfortable and secure" financially. Most reported that they were able to make ends meet. The study indicates that about ½ of Navy spouses are employed, and most work in their career field. The primary sources of childcare during the workday are offbase childcare centers and

school-age care, but the most preferred source of childcare was family, friends, or neighbors for spouses of enlisted servicemembers (46 percent) and officers (48 percent). The 2006 survey indicated a high level of marital happiness for officers (93 percent) and enlisted (86 percent) compared with 92 and 88 percent in 2002, respectively.

Figure 53. Most important Navy support programs and services[a]



Enlisted				Officers			
Females		Males		Females		Males	
Health care	89%	Health care	84%	Retirement benefits	93%	Retirement benefits	89%
Retirement benefits	88%	Retirement benefits	83%	Health care	90%	Health care	86%
Housing allowances	86%	Housing allowances	81%	Housing allowances	85%	Housing allowances	83%
Commissary	74%	Commissary	72%	Commissary	73%	Commissary	71%
Exchange	70%	Exchange	69%	Exchange	67%	Exchange	69%
Deployment services	54%	MWR	52%	MWR	46%	MWR	50%
FFSC	49%	Employment services for spouses	51%	Deployment services	42%	Fitness centers	49%
MWR	48%	Fitness centers	51%	Fitness centers	39%	Employment services for spouses	34%
Employment services for spouses	45%	Childcare services	49%	FFSC	35%	Deployment services	31%
Childcare services	44%	Deployment services	46%	Employment services for spouses	24%	Childcare services	29%

a. Source: Dr. Rosemary Schultz, Dr. Paul Rosenfeld, and Ms. Zannette Uriell, *2006 Navy Spouse Survey,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

2006 Navy Quality-of-Life (QOL) Survey

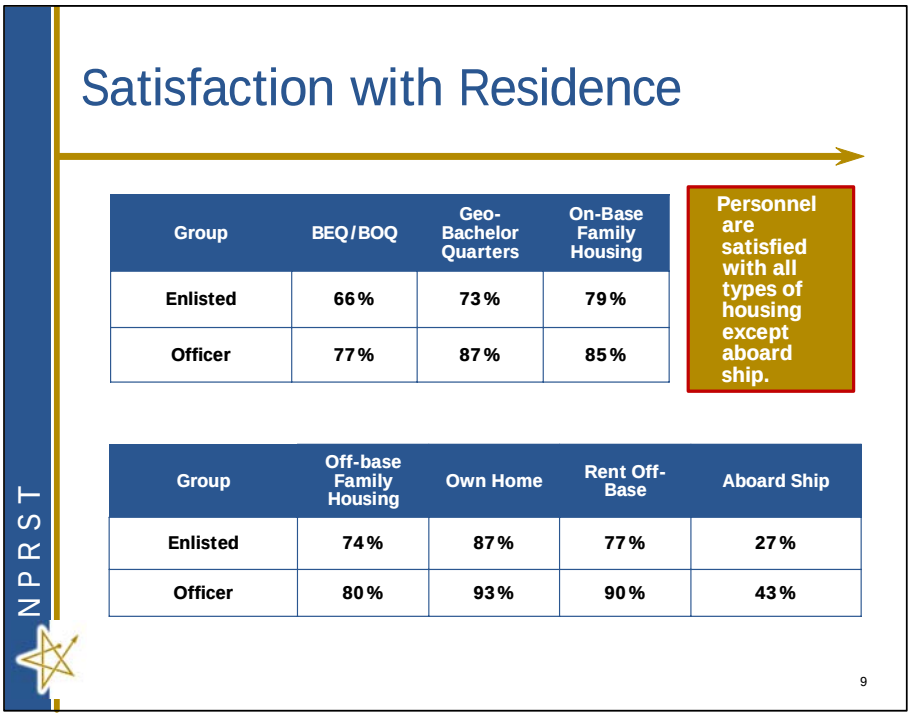
Dr. Paul Rosenfeld (NPRST), Dr. Gerry Wilcove (NPRST), and Dr. Rosemary Schultz (NPRST) began the presentation by giving a brief history of QOL surveys. In 1997, the Naval Inspector General recommended that Chief of Naval Personnel (CNP) assess shipboard habitability and its impact on retention. In 1998, CNP commissioned a Navy QOL Survey to assess QOL content areas, including shipboard

habitability. In 1999 and 2002, Navy QOL Surveys were conducted and briefed to CNP. In 2004, they recommended an N1 survey strategy that involved moving QOL and Navy-wide Personnel Survey (NPS) to the internet, shortening surveys, administering them more frequently to maintain current survey metrics, and funding both NPS and QOL surveys through the N1 Navy-wide Survey Program funding line.

Dr. Rosenfeld discussed the results of the 2006 QOL survey, which was administered from March 22 through May 23, 2006. Out of 17,151 eligible samples, there were 4,906 completed returns for a response rate of 31 percent, which is higher than other Navy-wide web surveys. Key demographics represented included paygrade, gender, and seashore. Survey categories included health and fitness, shipboard life, stress, finances, and deployment preparedness. The Navy was highly rated by enlisted and officers on its support of time for maintaining a "culture of fitness." Although the overall metrics for personal health were either the same or higher between 1999 and 2006, almost one-quarter of Sailors report that they are not satisfied with their physical fitness. Satisfaction with shipboard life has increased from 24 percent in 1999 to 44 percent in 2006 for enlisted members and 45 and 66 percent, respectively, for officers. Sailors are more satisfied with all other types of housing than they are aboard ship. However, shipboard habitability in terms of berthing, personal storage, noise, and especially communication with friends and family ashore have also increased for both groups.

Satisfaction with computer/internet access for educational and personal use is relatively low. The level of work stress from the 2005 survey to the 2006 survey has remained stable. In terms of finances, satisfaction with income and standard of living has increased for enlisted servicemembers and even more so for officers. The use of predatory lending (e.g., payday lender, rent to buy, automobile pawn, tax refund loans) has decreased minimally from the 2004 to the 2006 survey. Deployment preparedness (e.g., will preparation, power of attorney, bill payment, and childcare) among Sailors has also increased from 1999 to 2006. Finally, Dr. Rosenfeld said that the 2006 survey results seem to show more concern about the future with respect to Navy QOL and IA policies.

Figure 54. Sailor housing preferences[a]



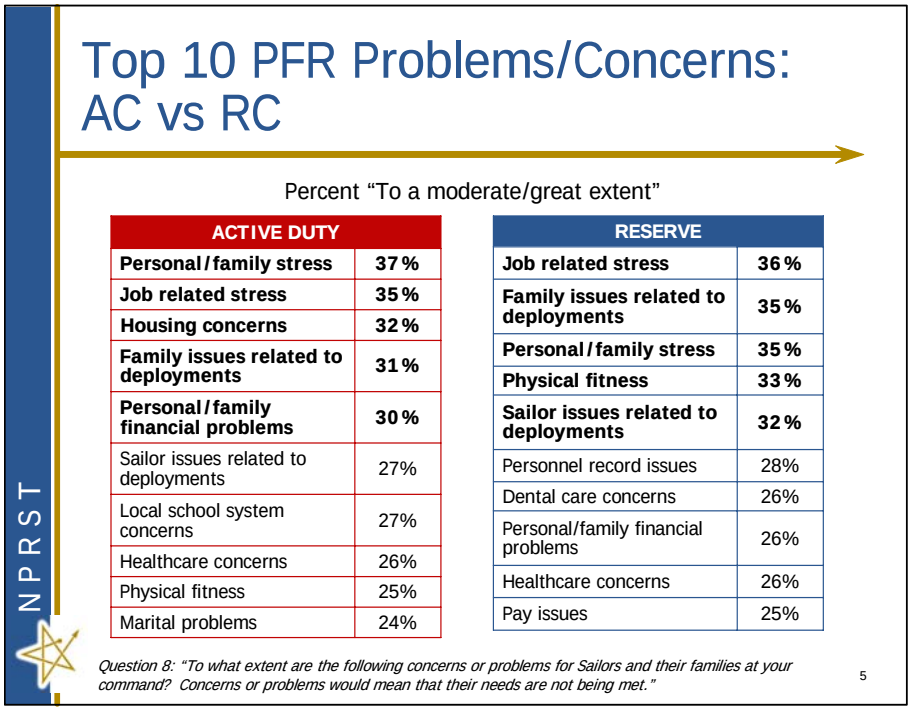
a. Source: Dr. Paul Rosenfeld, Dr. Gerry Wilcove, and Dr. Rosemary Schultz, *2006 Navy Quality-of-Life (QOL) Survey,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Navy Personal & Family Readiness (PFR) Leadership Assessment Quick Poll

Ms. Carol Newell (NPRST) and Dr. Rosemary Schultz (NPRST) presented the results of a poll that measured Personal and Family Readiness (PFR), which was developed with sponsors or adapted from established Navy/DoD surveys. The survey asked questions related to issues, concerns, and problems that may negatively affect a Sailor's quality of life, such as stress due to family/personal, job/financial, health, or housing issues. The sample included Navy commands with 10 or more active duty personnel, and they were given 10 days to complete the poll (March 13–23, 2006). The response rate was 24 percent—427 active component (AC) Command Officer CO/OIC returns out of 1,763 active duty UICs contacted.

The poll questions were categorized by issue area, service component and job position. AC and reserve component (RC) Sailors' concerns are very similar and often given similar weight in terms of the impact on PFR. Job (36 percent) and family stress (37 percent) were most often at the top of the list of problems for RC and AC, respectively. The components differ in areas such as housing, which is an AC (32 percent) but not an RC concern. Also, physical fitness (33 percent) is more of an issue for RC than AC. Personal and family stress was rated as a concern for AC overall and for different positions (e.g., CO, senior enlisted, and ombudsman). The RC overall and COs rated job-related stress the highest. RC senior enlisted rated physical fitness more highly, and ombudsmen rated deployment-related family issues highest.

Figure 55. Similarities and differences in PFR issues for AC and RC[a]



ACTIVE DUTY	
Personal/family stress	**37%**
Job related stress	**35%**
Housing concerns	**32%**
Family issues related to deployments	**31%**
Personal/family financial problems	**30%**
Sailor issues related to deployments	27%
Local school system concerns	27%
Healthcare concerns	26%
Physical fitness	25%
Marital problems	24%

RESERVE	
Job related stress	**36%**
Family issues related to deployments	**35%**
Personal/family stress	**35%**
Physical fitness	**33%**
Sailor issues related to deployments	**32%**
Personnel record issues	28%
Dental care concerns	26%
Personal/family financial problems	26%
Healthcare concerns	26%
Pay issues	25%

a. Source: Carol Newell and Rosemary Schultz, *Navy Personal & Family Readiness (PFR) Leadership Assessment Quick Poll,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

According to Ms. Newell and Dr. Schultz, the AC rated inadequate services as having a greater stress impact on the job and personal/family matters than all the other problems, with 40-, 32-, and 19-percent ratings by the CO, ombudsmen, and senior enlisted, respectively. The CO and senior enlisted also noted a moderate to great impact of stress on mission readiness. The RC rated inconvenient hours as the cause of personal/family stress, more than all other problems, with 39-, 14-, and 12-percent ratings from ombudsmen, CO, and senior enlisted, respectively. RC job stress was attributed to inconvenient location and no services available.

Ms. Newell and Dr. Schultz stated that predatory lending was found to affect AC more than RC. AC polls indicate 47 percent in letters of indebtedness to commands over a 12-month period. In addition, 39 percent of Sailor time was spent on personal financial matters over the past 12-month period. The majority of AC (53 percent) and RC (52 percent) reported that the impact of personal and family readiness on command readiness was slight. The majority of AC (51 percent) and RC (58 percent) reported low work stress and personal stress (57 and 53 percent, respectively) on Navy personnel at their commands. Finally, both components reported that the command was prepared to perform wartime mission with 91-percent and 87-percent ratings from the AC and RC, respectively.

An Examination of Employee Turnover Models

Dr. Michael J. Schwerin (RTI) and Dr. Tracy L. Kline (RTI) presented research on employee turnover models. Studies of turnover are important for the military for various reasons. Research can help us to understand work and non-work life needs that influence turnover. Studies can identify factors that are affecting the turnover of high-value personnel. They can facilitate organizational commitment by reinforcing the reciprocal relationship between the military, high-value personnel, and families. Additionally, results from modeling studies can be used to develop policy, incentives, and programs that improve retention. Dr. Schwerin said that many retention issues are also framed as QOL issues, and, even in the absence of turnover problems, understanding turnover drivers is important in keeping the best performers.

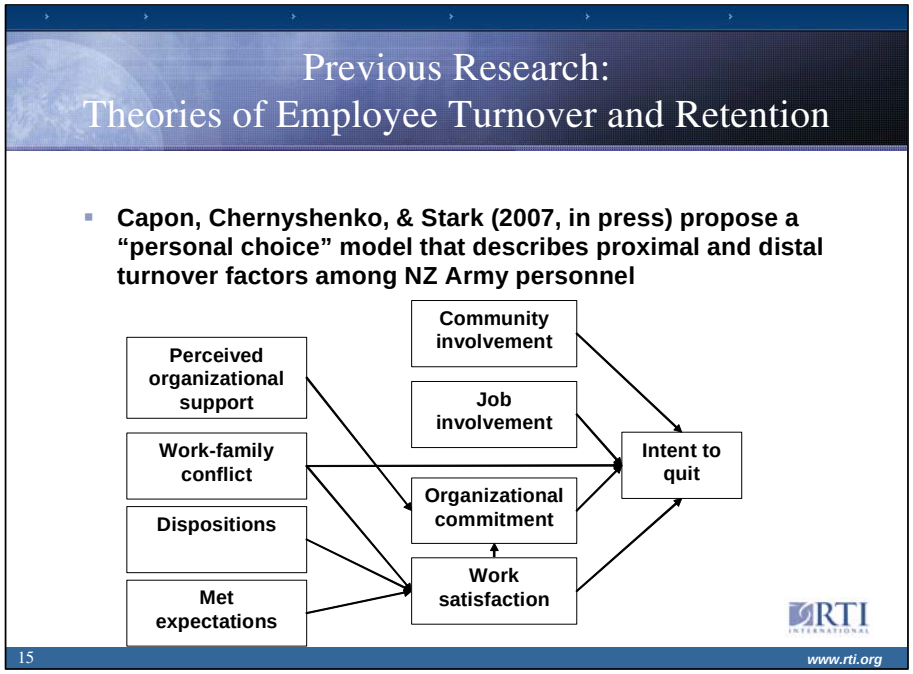
Dr. Schwerin's study set out to review the organizational research literature and examine selected civilian and military turnover models. The models were selected for review through a literature search of the psychology and business literature as well as military research conference proceedings. The selected models represented a comprehensive model of turnover rather than the effect of one variable on retention. They used turnover behavior as the outcome measure (with two exceptions) and structural equation modeling (SEM) for analyses. Many of the early theories of employee turnover and retention held that there is a "linear progression" that begins with job satisfaction and probability of finding acceptable alternatives. Sometimes these evaluations lead to thoughts about quitting, intent to search, and intent to quit, and eventually turnover occurs. Similar theory concepts are expressed in a more semilinear way. Other theories hold that a number of different factors may lead up to attitudes about job satisfaction and organizational commitment. Where organizational commitment is lacking, the intent to quit is triggered, and turnover results. Research has also evaluated the interaction of work and non-work stressors (e.g., work-family conflict).

A 2007 study found support for a model in which job and family stressors affect organizational commitment and turnover intent. Another this year study modeled such turnover factors as perceived organizational support, work-family conflict, dispositions, and met expectations, which place heavy emphasis on organizational commitment and work satisfaction that can lead to the intent to quit. According to Dr. Schwerin and Dr. Kline, the factors that feed into non-work life needs are important in that they can either lead directly to intent to quit or they feed into work-life needs and organizational commitment that may also determine intent to quit and ultimately turnover in both cases. Dr. Schwerin discussed several implications from these models. First, satisfaction (or dissatisfaction) influences turnover intent and behavior. Second, organizational commitment plays a major role in turnover. Third, work and non-work factors are both important in understanding turnover.

In terms of policy implications, job dissatisfaction needs to be preempted since this begins the turnover cognitive process. Leadership training at all levels should include an awareness of factors that lead

to Sailor turnover. Furthermore, research shows that reenlistment bonuses might not be the most effective mechanism for retaining the best Sailors. Non-monetary benefits might actually get more return on investment than monetary benefits. Analysts also believe that this new source of information may improve diversity issues as well.

Figure 56. Turnover factors among NZ Army personnel[a]



a. Source: Dr. Michael Schwerin and Dr. Tracy Kline, *An Examination of Employee Turnover Models,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Schwerin said that future research should consider measuring job dissatisfaction as well as job satisfaction. Though the civilian research literature continues to research turnover, there are few military turnover studies. Dr. Schwerin also stated that limitations to turnover research are many. First, there is a vast amount of research literature on turnover models. Second, only recent SEM models are used, limiting the scope of models examined. Third, most models describe how variables are related to turnover but are less clear about why.

Dr. Schwerin made the following recommendations. First, researchers should explore the interaction of job dissatisfaction and satisfaction in Sailor turnover models. Second, civilian models should be tested with military personnel survey data and military models with civilian employee data. Third, existing turnover models could be used to augment Navy personnel manpower planning tools. Fourth, identifiers should be included on personnel surveys for secondary data analyses, and methodological studies should be conducted on identified vs. not identified survey items. Finally, Dr. Schwerin recommends preserving the capability to conduct basic research within applied research constraints of the Navy survey strategy.

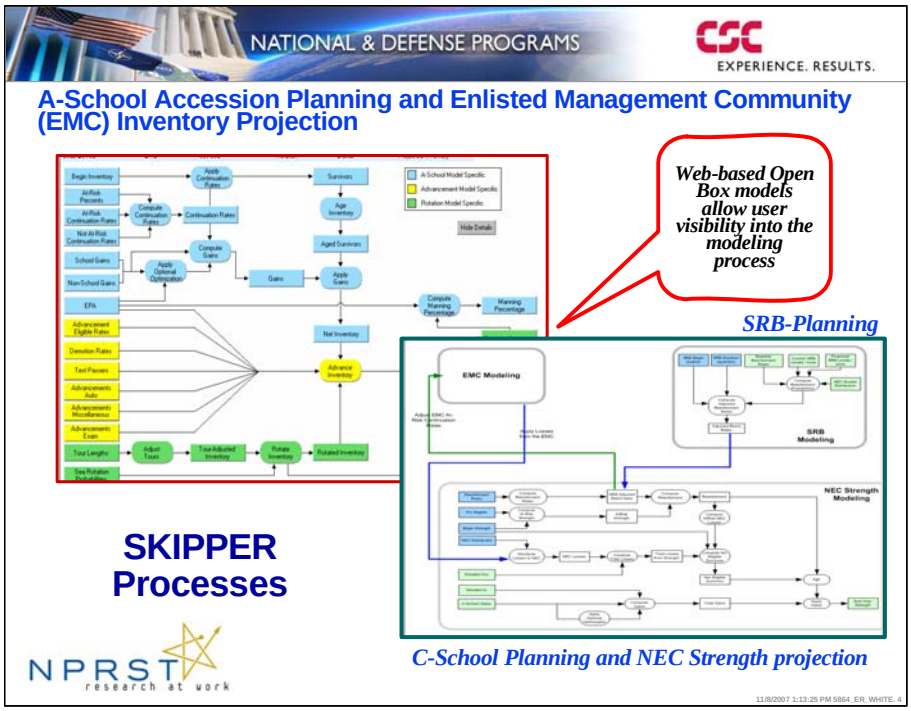
Community Management Models

Using the SKIPPER Decision Support Tool To Support Enlisted Community Management

Mr. Sanjay Nayar (CSC)—along with his research team members (Mr. Rick Loffredo (CSC), Dr. Chariya Punyanitya (CSC), and Dr. Colin Osterman (NPRST)—presented research on using the Skilled Personnel Projection for Enlisted Retention (SKIPPER) tool to manage the enlisted community. According to Mr. Nayar, managing enlisted communities requires not only visibility into the current metrics but also the ability to project inventories under different "what if" scenarios to effect analyses of alternatives and assessments of the long-term impacts of policy decisions. These projections must be targeted to evolving yearly Enlisted Programmed Authorizations (EPA) numbers in the aggregate or at the Length of Service (LOS)/zone level in order to achieve overall strength goals and a desirable force shape.

SKIPPER enables projection of community inventories 8 years into the future with a sophisticated model that incorporates force-shaping plans. The recently added capabilities to target any LOS when optimizing A-School plan inputs combined with the existing multizone (targeting Zones B, C, D) Retention Goaling ability provide Enlisted Community Managers (ECMs) with complementary planning mechanisms that allow control of both accessions and retention to help shape an Enlisted Community with greater accuracy and flexibility.

Figure 57. SKIPPER provides a visible EMC modeling process[a]



a. Source: Mr. Sanjay Nayar et al., *Using the SKIPPER Decision Support Tool To Support Enlisted Community Management and Strategic Analysis,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Mr. Nayar discussed the Manning and Retention Metrics produced by SKIPPER and available to ECMs and supporting analysts to assist in the shaping of communities. Using the powerful override capabilities within SKIPPER, users can prepare and analyze alternative scenarios to assess the long-term downstream impacts of various policy changes, such as fewer accessions or lower or higher retention levels. These metrics can then be compared with those from other scenarios using the scenario comparison report, allowing for a more meaningful tradeoff analysis. Mr. Nayar also discussed possible future enhancements to model Street-to-Fleet supply chain components, such as the Delayed Entry Program (DEP) and Recruit Training Command (RTC).

An Agent-Based Modeling Approach for Studying Manpower and Personnel Management

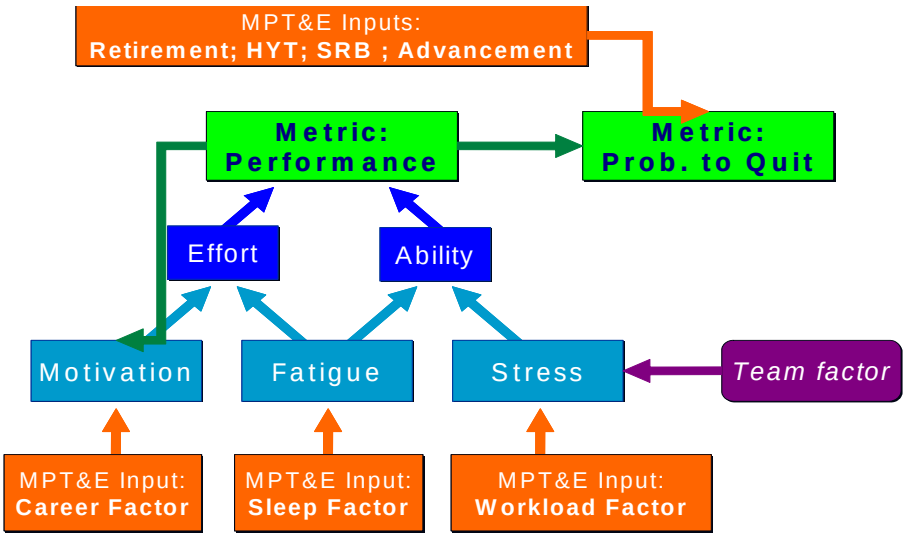
Dr. Denis Garagic and his research team from Icosystem Corporation described the development of a generalized agent-based simulation system, Integrated Manpower Personnel Agent Computer Tool (IMPACT), for modeling, analysis, and policy design for complex organizational behaviors and interactions of Navy Shipboard Manpower & Personnel (M&P) processes. According to Dr. Garagic, behavior of such a complex system is typically associated with a hierarchical structure in which the lowest level agents are characterized by continuous and discrete event-variable dynamics and the highest level agents by a heuristic based decision-making mechanisms. The interaction of these different levels, with their different types of information, leads to the hybrid representation of system behavioral dynamics by combined discrete/continuous modeling and simulation methodology (e.g., system dynamics approach) on one hand and its dynamic simulation by Agent-Based techniques on the other.

Dr. Garagic's team used the system dynamics approach to develop a model that describes the dynamics of a Sailor's behavior while he or she is enlisted with U.S. Navy. The model illustrates how psychological factors, such as stress and motivation (which are caused by a combination of effects of different U.S. Navy Manpower, Personnel and Training (MPT) policies), influence a Sailor's performance and his or her decision to continue to enlist or to leave the Navy. This system-dynamics-based model constitutes a basic "microscopic" element of an agent-based model of the U.S. Navy's M&P systems. Agent-based techniques are used to handle heterogeneity in behaviors and domain descriptions associated with shipboard M&P behaviors.

The advantage of the agent-based representation is its capacity to retain all information associated with the variability and interdependency between attributes of agents that might otherwise become lost if aggregate quantities were formed directly from individual data. Dr. Garagic said that complex relationships between individual Sailor's stress, motivation, and performance emerge from model structure and interactions, which allows researchers to perform analysis on two levels—an aggregate level and one lower level on which individual

Sailors can be dynamically modeled. Dr. Garagic's model makes it possible to gain a deep understanding of the dynamics of the entire M&P system. He expects that the tool will offer several benefits to the Navy, including the ability to (a) design new policies for existing ships or new ships, (b) understand the impact of shipboard technologies to increase automation, and (c) study the impact of various interventions on Sailor retention. Dr. Garagic said the model also promises to be useful for personnel management in the commercial sector.

Figure 58. The dynamic Sailor model[a]



a. Source: Dr. Denis Garagic et al., *IMPACT: An Agent-Based Model of Navy MPT&E,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

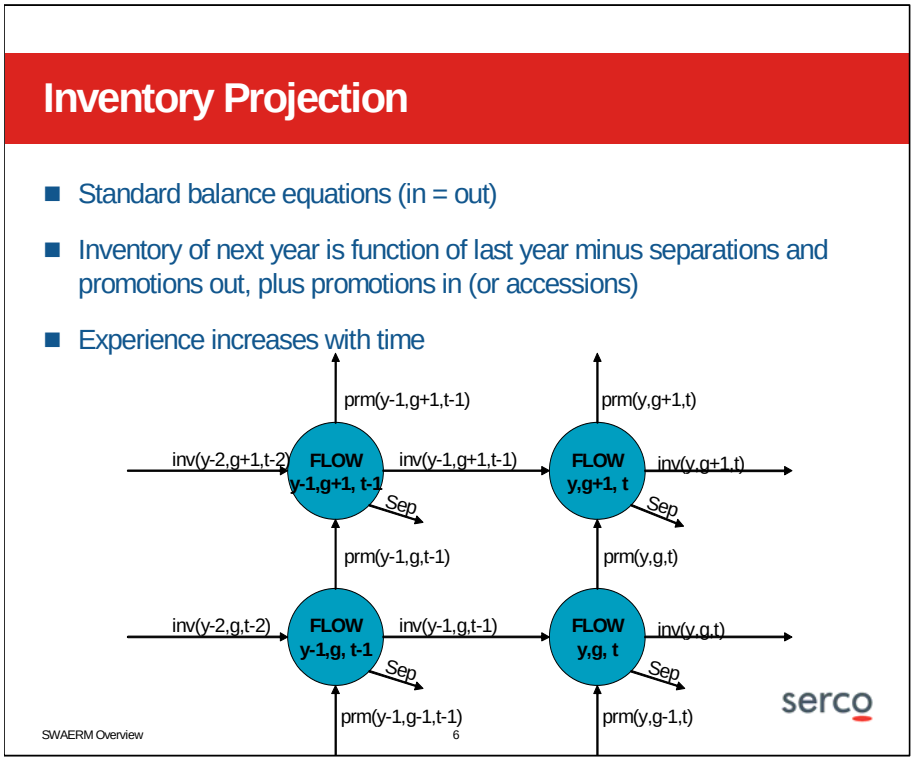
The Strategic Workforce Allocation Enlisted Resource Model

Dr. Steven Wilcox introduced the Strategic Workforce Allocation Enlisted Resource Model (SWAERM), which provides DoN personnel managers with a tool to evaluate the costs and benefits of various policy options. SWAERM provides the analyst with two visions of the projected enlisted inventory; the first is an optimal projection, while the second is a deterministic semi-Markov chain approach in the spreadsheet. The optimal portion of SWAERM models the enlisted

force as a network flow problem with side constraints, allowing the user to select one of three objective functions: operating strength deviation, cost, or deviation from endstrength goals.

Dr. Wilcox's mathematical model is written in Generalized Algebraic Modeling System (GAMS) language, but the user interface is through an Excel™ spreadsheet. The model generates the optimal projected Navy enlisted inventory for 15 time periods (years) into the future based on legal, policy, and regulatory constraints entered by the analyst attaining the optimal solution to the selected objective function. The associated accessions, promotions, and losses, produced by grade, length of service, and time period, are available to the analyst.

Figure 59. Modeling optimal projected Navy enlisted inventory[a]



a. Source: Dr. Steven Wilcox, *The Strategic Workforce Allocation Enlisted Resource Model,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

The deterministic semi-Markov chain portion of the model generates a projected inventory focused on the annual targets as selected by the user through the objective function. Multiple scenarios can be generated rapidly and analyzed through the spreadsheet interface. Dr. Wilcox's model provides a series of standard graphs that display metrics to the analyst; more detailed analysis is supported through extensive supporting output tables for accessions, separations, and promotions for each time period at grade and length of service dimension. The model also outputs possible recruiting/training billet adjustments.

Supply Chain

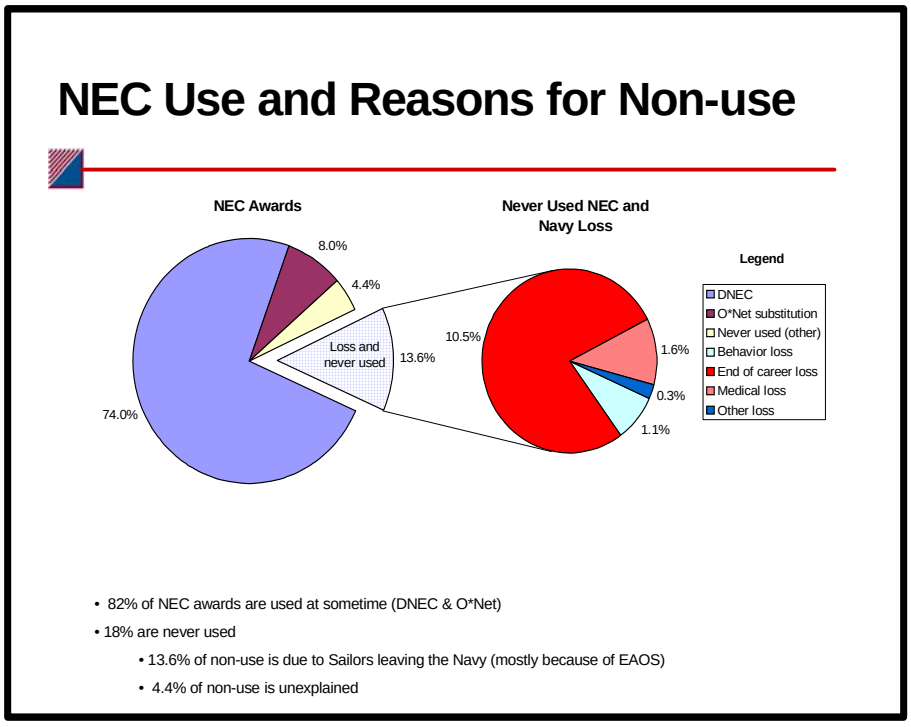
NEC Use and Re-use

Dr. Pete Stoloff (CNA) presented a study in which CNA was asked to examine the use and reuse of specialized enlisted training. Navy Detailers are responsible for assigning Sailors to Navy jobs based on their training and skills. Most jobs are specified by a rating and Navy Enlisted Classification (NEC) requirement. Dr. Stoloff said that Sailors most often earn an NEC by attending "C-School" and sometimes by on-the-job training (OJT). According to Dr. Stoloff, the "gold standard" for job assignment is to match actual training (NEC) with the billet requirement. Often a Detailer will assign a Sailor holding a related NEC to a job, despite the lack of the specific NEC training. The CNA study looked at how well the Navy uses this training and for opportunities to do better.

Since direct NEC (DNEC) may not capture all use/reuse of training, Dr. Stoloff used a Department of Labor classification scheme called Occupational Network (O*Net), which is based on similarity of job tasks, to measure NEC use/reuse not always captured by a DNEC. A database was constructed containing data on Sailors who were awarded NECs during 1988 through 1999. Roughly 150,000 job assignments were tracked for up to 10 years (4 tours). The analysis was limited to the 47 ratings wherein Job Families having 2 or more NECs per family could be constructed. All matches were tallied for NEC (training) and DNEC and O*Net- based assignments.

Dr. Stoloff's results for initial NEC use indicate that about 82 percent of awards are used at some time, with most use occurring during the first assignment following C-School (70 percent). Dr. Stoloff said that about 11 percent of NEC awards are never used because Sailors reach the end of obligated service (EAOS) without having an opportunity to use the NEC. Furthermore, about 3 percent don't use their NECs for other reasons, such as medical or because of disciplinary problems. To put the observed NEC reutilization in perspective, Dr. Stoloff developed a simple model to estimate the maximum rates observed, subject to certain constraints, such as insufficient data about availability of a billet/job at time of assignment, needed to fully parameterize the model. As a result, Dr. Stoloff estimated the theoretical maximum expected NEC reuse rate to be about 54 percent for those earning NECs during the analysis period.

Figure 60. Initial NEC assignment rates[a]



a. Source: Dr. Peter Stoloff, *NEC Use and Re-use,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

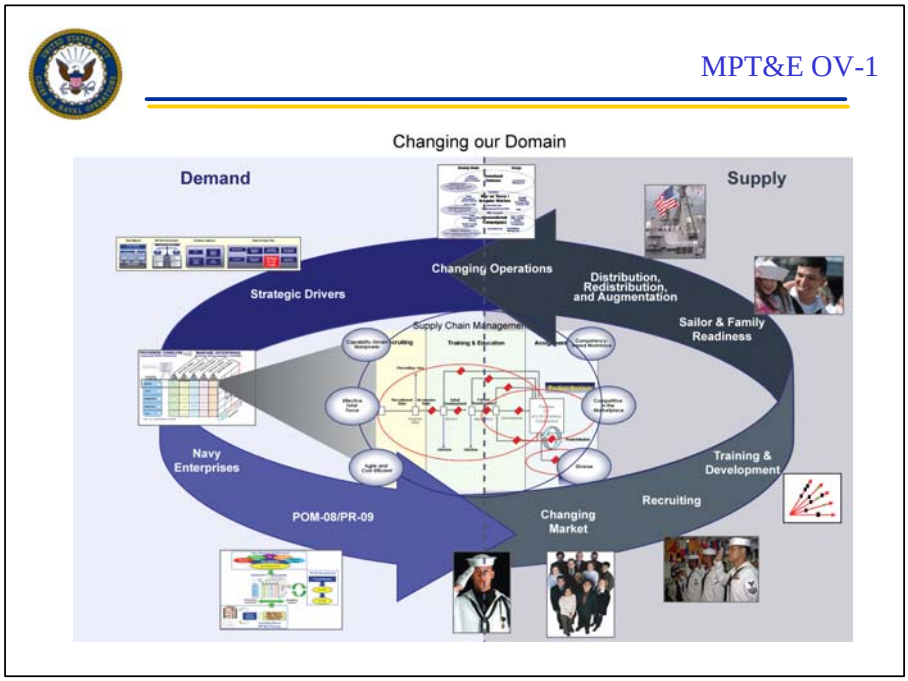
The results from Dr. Stoloff's reuse metrics show that 37 percent of NECs are reused at least once. Of the 37 percent, 26 percent were DNEC, and the remaining 11 percent are considered reusers because the DNEC was to a linked O*Net Job Family. In addition, 18 percent never used their NECs with loss to the Navy being the biggest reason for not reusing an NEC (33 percent). Also, many Sailors reuse their NECs more than once. In summary, Dr. Stoloff's empirical results have shown that NECs are being reused, and this has produced savings to the Navy by avoiding training "new" NECs. He reiterates that loss to the Navy is by far the biggest reason there isn't more reuse of NECs, and there is a relatively small percentage of Sailors who fail to reuse an NEC for no apparent reason. Dr. Stoloff said that, in the near future, NECs may be replaced by some other metric. He believes that whatever that metric is, it can be, and should be, monitored to ensure efficient use of the training investment using some of the same techniques used in our analyses.

Production Management Office (PMO)

Mr. George Taylor, Director of the Production Management Office, discussed current issues in enlisted accession supply chain management (SCM) and the PMO's role in helping to meet SCM challenges. According to Mr. Taylor, the enlisted accessions are extremely complex and constantly changing with no single organization responsible for all segments of the production process. The enlisted accessions supply chain, which recruits, trains, and distributes personnel for naval missions, is under extreme pressure to produce the proper mix of Sailors. The enlisted supply chain recruiting component seeks to fill recruiting goals while taking into account the need of each of the specific community requirements, those already shipped to RTC and those in the DEP subject to DEP loss of 18 to 20 percent. The training components take new recruits into basic training and the various training schools and levels, while accounting for attrition (loss to the Navy) and failure to graduate from the courses to their first permanent duty assignments in the Navy. At many different points in that initial accession process, Sailors can be redirected into different career tracks though the work that the PMO is doing in reclassification. The supply chain continues to a full 20- to 30-year enlisted career through fleet redistribution and fleet attrition, accounting for

transients, patients, prisoners, and holdees (TPPH) and individual augmentations. In accordance with industry themes, supply chain management should entail total real-time visibility of inventory, a well-defined strategy business model, common vocabulary/taxonomy, and clear rules, roles, and responsibilities. SCM also requires leadership support, dedicated empowered production managers, customer focus, and a culture that is willing to change by planning ahead and believing in the success of the enterprise in terms of best fit and cost.

Figure 61. Managing the changing supply chain domain[a]



a. Source: Mr. George Taylor, *The Production Management Office,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Optimal performance requires that many domain supply components (e.g., changing market, recruiting, training and development, Sailor and family readiness, and distribution, redistribution, and augmentation) and demand components (e.g., strategic drivers, Navy enterprises, and enablers) function together. However, often the

components that affect enlisted supply chain have lacked clear visibility, and many functions with unique goals are stove-piped, resulting in suboptimized chain performance. The current accession supply chain has many process owners manning their own areas of specialty. Furthermore, current IT systems do not support visibility across the supply chain. There needs to be a single organization to manage the accession supply chain across the seams. To effectively support the production management function, a business intelligence capacity (e.g., information visibility, modeling, statistical analysis) should be developed. Also, fleet requisitions are not tied to accession plans, so a valid apprentice level vacancy signal needs to be developed.

The PMO is working to provide management for the various components of the enlisted accession supply chain. Proper demand planning is critical to better defining the production plans that can meet the needs of the Enlisted Community Manager. These plans can then be used to enable effective SCM. Planning involves making determinations about requirements for sea billets, shore billets, and individual accounts. Once billet requirements have been determined, endstrengths must be authorized, and requirements validated. Strategic and tactical decision-makers rely on the demand signal for MPTE planning.

The PMO can help with SCM in many ways. First, the PMO can provide detailed production plans (rating phasing matrixes) with respect to recruiting, training, and distribution to achieve FIT/Cost goals in support of approved enterprise goals. PMO uses developed metrics to aid in proactive recommendations for accession execution. PMO can also manage the seams between processes to ensure that the most efficient operation and handoffs occur between segments of the supply chain. The SCM process is then able to coordinate across all stakeholders, as well as with other services as required, for joint school seats. Furthermore, the process can highlight disparate goals between stakeholders and queue them up for leadership decisions on tradeoffs to maximize MPTE domain goals. PMO is able to maintain a proactive rather than reactive status and is linked to OPNAV N13 demand planners and BUPERS 3 Enlisted Community Managers. PMO also provides GBOD/COO/CNP actionable recommendations regarding optimization/suboptimization across the domain in order

to achieve FIT and best value. PMO allows development of BCAs to support execution year tradeoffs by managing risk for greatest ROI. Finally, PMO helps to maintain focus on current and future indicators/trends as they move from reactive to proactive. In the future, support tools/models will be developed to provide linkage between production teams and provide CNP and other MPTE leaders with monthly metrics.

Mr. Taylor concludes by reiterating that a poorly performing supply chain is usually overmanned or undermanned, resulting in high costs and operational inadequacies. A holistic, consistent view of inventory and demand is needed. Integrated functions should have a common goal. The most efficient path to customers will provide visibility across the accession supply chain.

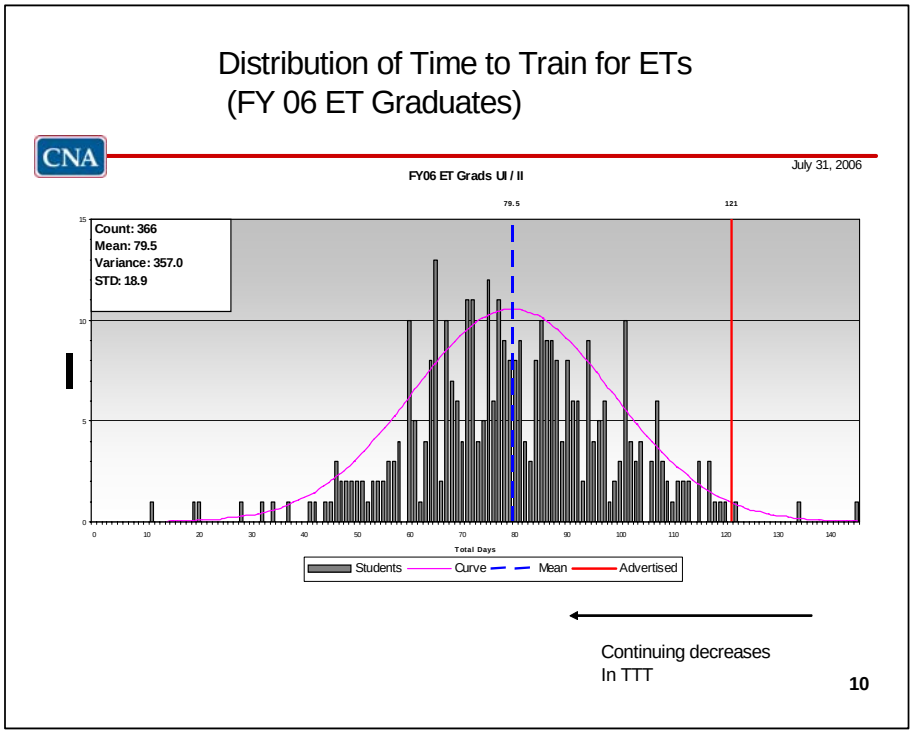
Time To Train in Self-Paced Courses

The Navy has made large strides toward computer-mediated learning. Dr. Neil Carey (CNA) discussed a research study that examined time to train (TTT) in self-paced courses. Naval leaders are interested in knowing the mid- to long-term effects and return on investment (ROI) from computerization. Analysts believe that databases can be used to analyze the mid- to long-term effects of these changes. Dr. Carey's research set out to answer the following questions: (1) Has converting A-School courses to computerized self-paced format decreased TTT? (2) If so, were savings achieved at the expense of students' later success in Navy? (3) How much reduction in TTT should be expected? (4) Do these decreases result in significant savings to the Navy, and, if so, which types of courses should be given priority for conversion?

Dr. Carey reported that, in this study, the continuum of learning methods include the traditional classroom delivery method, distance/distributed learning delivery methods, and advanced distributed learning delivery methods. The approach was to first review literature and methodologies, then choose courses of interest and augment a database to provide an example of the method, analyze the Street-to-Fleet database, and finally report the results. Researchers believe that these tasks will emphasize implications for training decisions, plans, and policy. First, the analysts needed to develop a

clear way of determining when the courses changed from instructor-led to computer-based, self-paced (CBSP). The ratings of interest were chosen as a result of discussions with Navy Personnel Development Center (NPDC). Discussion group members expressed a preference for one technical and one nontechnical rating. Examples of some ratings that were chosen include ET, FC (technical ratings) and YN (administrative rating). Researchers examined the pipeline for training, and the distribution of time for training among FY 06 ET graduates. Regressions were run to predict under instruction (UI) times for the ratings before and after conversion to CBSP. Comparisons were made between those who dropped out and those who graduated before and after conversion. Analysts also compared the speed of reaching fleet and sea duty after A-School and success in C-School.

Figure 62. Preliminary finding of decreasing time to train[a]



a. Dr. Neil Carey, *Time To Train in Self-Paced Courses,* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Carey's study results indicate that self-paced courses reduced TTT, but ET course drops were somewhat higher after the conversion. According to Dr. Carey, there is no evidence that self-paced learning adversely affects mid-term or long-term progress, but continued followup is advisable. Policy changes to reduce awaiting instruction time (AT) could deliver significant savings, especially in ratings such as YNs with relatively short A-Schools.

Increasing Navy SEAL Throughput in Accessions Through a Focus on "Mental Toughness"

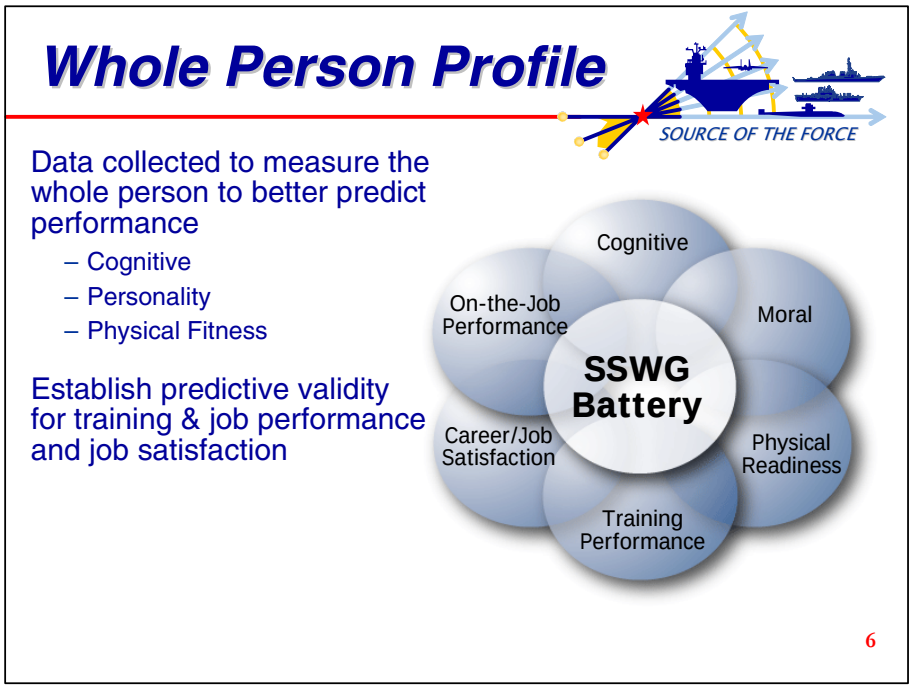
Dr. Burt Krain (Human Performance Center) and Dr. Jackie Mottern (NPRST) presented a study on increasing Navy SEAL throughput in accessions. The study shifts the focus from physical selection criteria to cognitive and non-cognitive criteria, which the research team believes should help increase predictive success and throughput of SEAL candidates entering BUDS. The study was chartered by the Naval Service Training Command (NSTC) in June 2006 and involved a 2-year implementation plan. MPT&E efforts were consolidated to decrease cost, increase efficiency, and reduce redundancy. Literature reviews were used to develop the major constructs, and a subject matter review at BUDS validated the major constructs. A test battery was developed in a 3-month time frame.

The overall objective of the study was to develop a SEAL Selection Psychological Battery (SPB), which consolidates multiple/overlapping efforts and could be administered in a short time period (2.5-hour threshold/1.5-hour goal). The SEAL battery was developed to be a good predictor of successful BUD/S training and performance.

According to Dr. Krain and Dr. Mottern, the primary goal was to directly support the GWOT effort. This goal should be achieved along with an increase in interest and investment throughout the SEAL recruitment and training pipeline. Furthermore, the SPB will determine if candidates have the "Heart of a Lion." Another goal was to increase the applicant pool with those who have a higher potential for success. Researchers hoped to gain early identification of high-potential candidates for recruiting, as well as early identification of unidentified potential. At the same time, the SPB should identify

candidates who are "at risk." Finally, the SPB may provide coaching and mentoring. Data were collected to measure the whole person in terms of cognitive ability, personality, and physical fitness, and were used to establish predictive validity for training & job performance and job satisfaction.

Figure 63. Identification of SEAL potential through measuring the whole person[a]



a. Source: Dr. Burt Krain and Dr. Jacqueline Mottern, *Increasing Navy SEAL Throughput in Accessions Through a Focus on "Mental Toughness,"* briefing presentation for the Seventh Annual Navy Workforce Research and Analysis Conference, 2007.

Dr. Krain and Dr. Mottern's preliminary results indicate that all subscales that had a reliability >.70 were included in discriminant analysis and logistic regression. Predictive subscales for UI (n = 156) vs. DOR (n = 95) included the following: personality, leadership, achievement, adaptability, stress tolerance, positive cognitive affect, performance strategies, and willingness to learn. Also, the initial screening physical fitness test scores improve classification.

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Conclusion

The *Seventh Annual Navy Workforce Research and Analysis Conference* provided a valuable forum for presenting and discussing initiatives that support the DON's goal to enhance the Navy's workforce. Particular attention was given to changes in the Navy's 2025 workforce. The various research organizations offered significant insight into problems, initiatives, methodology, and analyses for future program development in such areas as competency management, training and fleet performance, compensation, quality of life, and diversity. Through the exchange of ideas and information, this conference has succeeded once again in its efforts to bring people together in support of the Navy's workforce priorities for the near future and beyond.

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List of figures


CNA