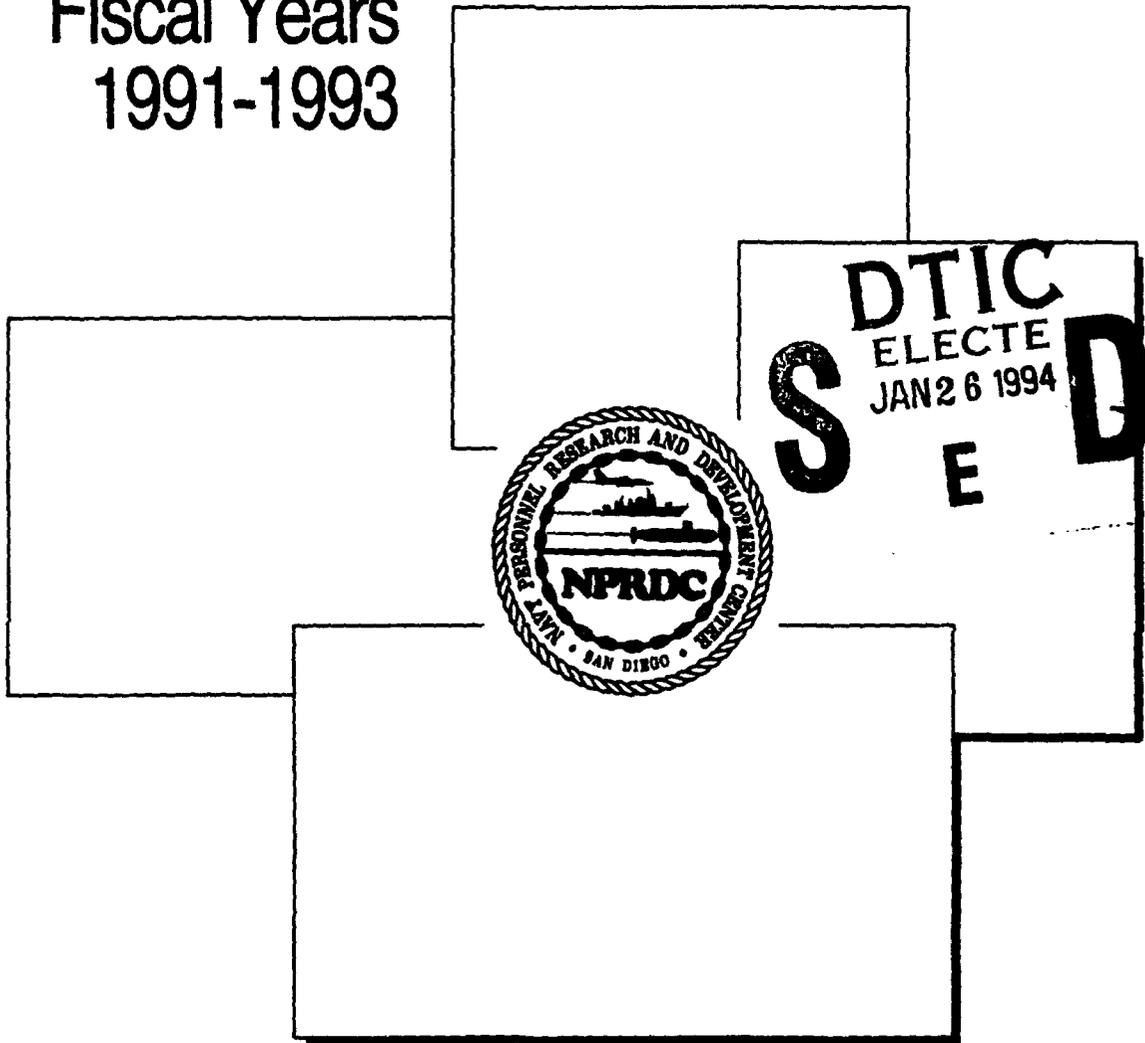


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Top Products

Fiscal Years
1991-1993

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**Best
Available
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Top Products

Released by
John D. McAfee
Captain, U.S. Navy
Commanding Officer
and
Richard C. Sorenson
Technical Director (Acting)

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Foreword

The Navy Personnel Research and Development Center (NPRDC) is an applied research center supporting Navy and Marine Corps personnel readiness. The Center develops better ways to attract qualified people to the naval services, to select the best, to assign them where they are most needed, to train each one effectively and efficiently, and to better manage personnel resources. By combining a deep understanding of operational requirements with first-rate scientific and technical expertise, the Center develops new, useful knowledge and refines technology to address people-related issues. NPRDC is responsive to the needs of manpower, personnel, and training (MPT) managers in the Navy, Marine Corps, and DoD, to the operating forces, and to the shore establishment that trains and supports the Fleet.

MPT R&D methods are derived from behavioral, cognitive, economic, and social sciences as well as from applied mathematics and statistics. These methods result in tangible products for the Navy and Marine Corps. NPRDC constantly searches for technological opportunities to improve personnel readiness and to reduce manpower costs.

NPRDC works as much as possible in the operational setting where products will be used. This ensures that the users' needs and requirements are met and that the users become fully familiar with the product's capabilities. This, in turn, increases the likelihood of product implementation and operational use.

NPRDC's R&D program addresses four functional areas: **Manpower, Personnel, Training, and Organizational Systems**. This publication highlights the top products selected from hundreds developed within these functional areas during FY91-93.

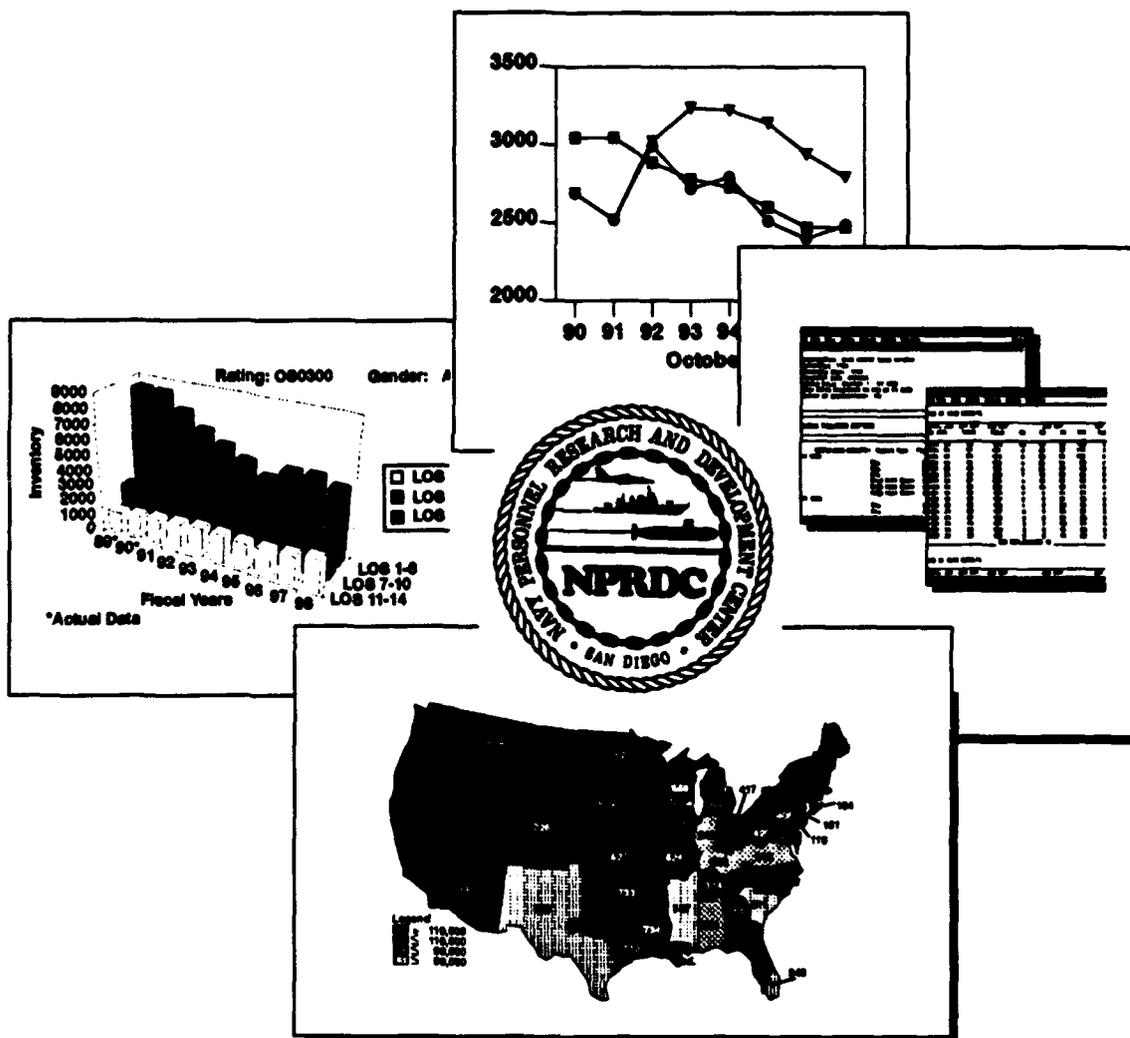
Additional information may be obtained by contacting Dr. Richard C. Sorenson, Technical Director, (619) 553-7813 or DSN 553-7813.

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Manpower

Develops new computer-based systems and methods for allocating manpower resources, developing personnel inventories, and distributing/assigning those personnel to improve military readiness and control costs.



Skilled Personnel Projection for Enlisted Retention (SKIPPER)



Problem

- OP-132 lacked consistent, accurate, and integrated accession, school planning, and reenlistment management tools for Enlisted Community Managers (ECMs)

Approach

- Develop easy-to-use, spreadsheet-based inventory projection model to support all community managers

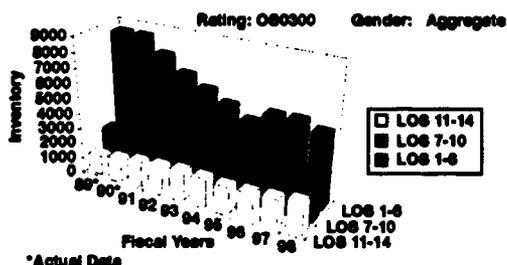
Products

- SKIPPER
 - Projects rating or Enlisted Management Communities (EMCs) inventories by length of service (LOS), gender for up to 8 future years
 - Provides detailed specification of school plans and "what if" modeling capabilities
 - Estimates impact of selective reenlistment bonus (SRB) plans on future strengths
- ENCORE
 - Derives reenlistment plans needed to meet out-year strength objectives
- APM (Accession Planning Module)
 - Develops accession plans to meet strength objectives, smooth school loading

Skilled Personnel Projection for Enlisted Retention (SKIPPER)



Size of SKIPPER SRB Zones A - C



Applications

- SKIPPER
 - Used by Enlisted Community Managers (ECMs) to develop school, SRB plans
 - Used by strength planner to obtain accurate longevity distribution
 - Only modeling tool supporting Enlisted Management Communities (EMCs)
- ENCORE
 - Used by ECMs to determine first term reenlistment opportunities
- APM
 - Used by ECMs to develop school plans

SKIPPER

When BUPERS' enlisted community managers need to develop school or reenlistment plans for their ratings, they turn to NPRDC's *SKIPPER* model.

"With the *SKIPPER* model, NPRDC has taken Navy enlisted community management from the Stone Age to the 1990's," says CAPT Ronald Peterman, Director of the Enlisted Plans and Career Management Division at BUPERS. "Previously, inventory projections were done on the back of an envelope. Now, a validated and consistently applied analytical method is used to produce defensible personnel projections and plans."

The new method is *SKIPPER*—Skilled Personnel Projection for Enlisted Retention—a suite of mathematical and statistical models that help produce the right supply of trained personnel in each skill area. *SKIPPER* enables managers to forecast manning levels under current and proposed policy scenarios.

Now, BUPERS can identify enlisted skill shortages and excesses faster and with greater precision. As a result, managers can take quick action to avoid expensive and undesirable personnel policies. *SKIPPER* has helped eliminate unneeded and costly reenlistments in overmanned skills, pinpointed skills where incentives are best used, and reduced the time students await instruction, permitting more efficient use of schools.

The *SKIPPER* system has three components: an inventory projection model (*SKIPPER*), a reenlistment control model (*ENCORE*), and an accession planning model (*APM*). *ENCORE* supports centralized control of first-term reenlistments; it recommends the number of reenlistments that should be accepted in each skill to meet current and future strength targets. *APM* allows managers to compute optimal school plans for meeting present and future strength needs.

"*SKIPPER* provides great analyses," according to CDR Dennis Davidson, community manager for Hospital Corpsman and Dental Technicians. "It is the best mechanism to plan and project outyears and to ensure having the right mix of people on the platform and on the job."

Sea/Shore Rotation Model (COURTNEY)



Problem

- Enlisted Community Managers (ECMs) had no tools to manage sea/shore rotation policies or to assess the feasibility of achieving given sea/shore billet structures

Approach

- Develop PC-based models to project impact of advancement, training, accession, retention, and sea/shore rotation policies on distributable strength (pay grade/type duty) within each enlisted management community.

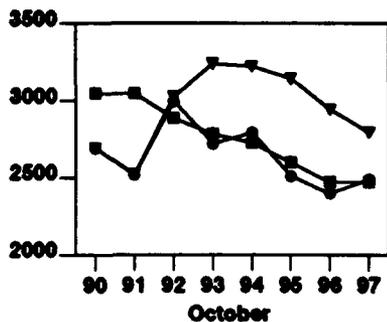
Product

- COURTNEY
 - Projects inventories by sea/shore/neutral/individuals' account
 - Includes paygrade and length of service dimensions
 - Allows user to adjust rotation, training, advancement, accession, and retention policies
 - Presents projections in useful graphs and tables

Sea/Shore Rotation Model (COURTNEY)



Sea Inventory/Billet Projections HT Journeyman



■ Sea Billets ▼ Inventory (Sea tour = 60 months)
 ● Revised inventory (Sea tour = 48 months)

Applications

- A fully operational version of the Sea/Shore Rotation Model System (SSRM) was installed in PERS-221
- SSRM is used by ECMs to evaluate alternative personnel policies to respond to planned force reductions
 - Sea/shore tour lengths
 - Advancement opportunities
 - Accessions
 - High year tenure limits
 - Training time



Managing Sea-Shore Rotation . . .

COURTNEY

The Navy faces the unique challenge of rotating sailors from sea to shore duty. Personnel planners in BUPERS must balance sea and shore manning to meet fleet operating requirements and the needs of sailors to come ashore. Failure to achieve this balance results in undermanned fleet units, readiness problems, extended sea tours, and ultimately retention problems.

Planners have struggled with determining the right sea/shore rotation patterns for enlisted skills that are necessary to properly man sea and shore units. Sea/shore manning and tour lengths have often been "whipped-sawed" by all the other personnel management issues and policies, including retention, advancement, accessions, training, and the requirements structure. However, BUPERS now has a tool that explicitly accounts for sea/shore rotation policy and its interactions with these other personnel policies.

The *COURTNEY* model, developed by NPRDC, allows Enlisted Community Managers in BUPERS to forecast the interactive effects of accession, training, advancement, retention and sea/shore rotation policies on sea and shore manning. These projections are made by skill and paygrade. *COURTNEY* is the only tool that can assess the feasibility of achieving a specific sea/shore requirements structure.

COURTNEY is used regularly to verify or modify sea/shore tours for over 200 Navy enlisted skill areas. *COURTNEY* reduced the effort needed to set accurate sea/shore tours from several weeks to several hours.

COURTNEY was developed as a collaboration between NPRDC and the Center for Naval Analyses (CNA). *COURTNEY* is based on the Personnel Management Integration Tool (PERMIT), originally developed by CNA. NPRDC made numerous enhancements to improve the model's fidelity, accuracy, and data displays.

COURTNEY is now fully implemented. A new capability, to find the optimal tour length policy for a skill area, will be installed during FY94.

Obligated Service Contract Analysis Report (OSCAR)



Problem

- Persistently high forecasting errors in FY90 and FY91 led Navy enlisted strength planners to make costly adjustments in recruiting and promotion plans

Approach

- Develop computerized model to forecast end-of-contract (EAOS) losses, reenlistments, and extensions more accurately and assess tradeoffs among these actions

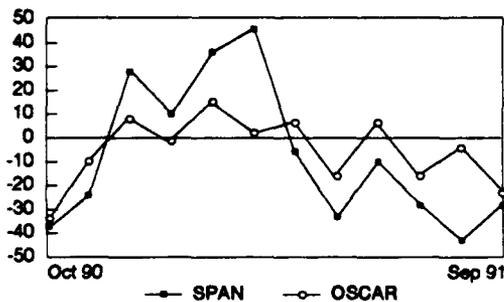
Products

- Obligated Service Contract Analysis Report (OSCAR)
- Enlisted Transactions Information System (ETIS)

Obligated Service Contract Analysis Report (OSCAR)



SPAN* and OSCAR Monthly Forecast Error USN Reenlistments, FY91



Strength Plan (SPAN) dated 10/31/90
OSCAR Forecast dated 10/22/90 (DP = 89 + 90)

*Strength Planning Model

Applications

- Allows user to test a variety of retention and separation policies
- Automatically forecasts EAOS-related actions by month and grade
- Updates the EAOS database and personnel actions each month
- Links model outputs to other systems



Forecasting Reenlistments . . .

OSCAR

In the second half of FY90, Navy reenlistments and its complement, Expiration of Active Obligated Service (EAOS) losses, suddenly shifted to new levels. Analysts in BUPERS (PERS-22) responsible for forecasting these personnel flows started making very large forecasting errors. For instance, the average monthly error in forecasting careerist losses in that period exceeded 40 percent and reenlistments were off by 31 percent. Left unattended, these errors would have generated sizable overruns in the Navy's manpower appropriation—a violation of law. To avoid this, the Navy delayed thousands of promotions and stopped the input of recruits, idling training facilities until the next year. In FY91, the large forecasting errors persisted. Once again cost avoidance actions were necessary.

To reduce the forecast error and need for cost avoidance measures, NPRDC developed a series of mathematical models that forecast EAOS actions. These actions include all EAOS losses, reenlistments, and contract extensions. Over 150,000 EAOS actions occur annually. The Obligated Service Contract Analysis Report (*OSCAR*) model forecasts these actions by month, paygrade, career status, and branch of service for up to 4 future years.

Based on validation studies for FY91, *OSCAR* reduced forecasting error by 58 percent for EAOS losses, 54 percent for reenlistments, and 92 percent for extensions. *OSCAR* helped planners in PERS-22 avoid permanent change of station move "freezes," delayed promotions, and unnecessary force separations or "RIFs" for the past 3 years.

Currently, *OSCAR* is used by PERS-22 planners each month to forecast EAOS actions for the next 48 months. Occasionally, the model is used to test the impact of policies affecting retention, such as Variable Separation Incentive (VSI) and Special Separation Benefit (SSB).

USMC Enlisted Planning System (EPS)



Problem

- Headquarters, USMC lacked automated tools to develop and monitor accurate, defensible enlisted manpower plans

Approach

- Develop integrated enlisted modeling system

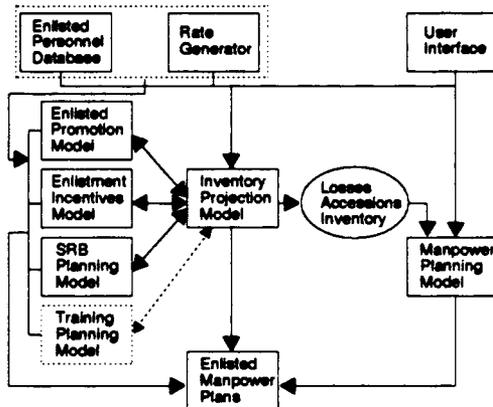
Products

- Enlisted Planning System
 - Inventory Projection Model (IPM)—Enlisted Promotion Model (EPM)
 - Manpower Planning Model (MPM)—EPS Database
 - SRB Planning Model (SRB)

USMC Enlisted Planning System (EPS)



EPS "Blueprint"



Applications

- Allows easy performance of "what-if" exercises
- Allows the user to quickly and easily change any of the defaults
- Automatically passes data, rates, and other parameters between models
- Allows selective viewing and printing of output



Integrating Marine Corps Manpower Planning . . .

EPS

Marine Corps managers have long used analytic tools to help develop accurate, defensible and executable manpower plans, policies, and budgets. But, these tools were rudimentary, slow, and inaccurate. Analysts had to wait days for a single run of their planning model and had little faith in the end product—until NPRDC developed the Enlisted Planning System (*EPS*).

“The Marine Corps spent more than 80 man-hours preparing for budget submission,” said MAJ Jack Rickman, a USMC manpower planner. “I can produce a thoroughly documented plan in less than 8 man-hours with *EPS*.”

EPS is an integrated set of mathematical and econometric models, a supporting database, and a user interface. It supports the development and monitoring of plans for enlisted manpower, reenlistment, promotion, and accession. *EPS* also allows planners to test and evaluate the impact of personnel policies before implementing them.

By improving the accuracy of its strength forecasts, *EPS* helped the USMC avoid costly, catastrophic personnel actions, even during the draw down.

The central component of *EPS* is the Inventory Projection Model (IPM), which simulates the behavior of the entire enlisted personnel system by forecasting end-of-contract and attrition losses, accessions, reenlistments, and promotions by occupational field, paygrade, and length of service. These forecasts yield end-of-year strength projections.

Forecasts produced by the IPM are passed directly to the Manpower Planning Model (MPM). That model phases the predicted personnel flows (e.g., losses) across the months of the current and following fiscal year to: (1) meet authorized end strength and (2) avoid exceeding the USMC's manpower appropriation. The MPM also allows planners to monitor the execution of this plan during the fiscal year and develop changes.

The Selective Reenlistment Bonus (SRB) planning model optimally allocates an SRB budget to maximize manning in critical skills. The model can also be used to determine costs of SRB plans involving different bonus multiples and skills.

EPS runs a 486-class personal computer. Components of *EPS* have been implemented since FY89. The system will be fully operational in FY94.

Joint Specialty Officer Modeling System (JSOMS)



Problem

- The Navy's Joint Specialty Officer managers lacked tools to assess the Navy's ability to comply with requirements to fill joint duty assignments and subsequent impact on officer career management

Approach

- Develop a simulation model to analyze the immediate and long-term impact of joint policy implementation

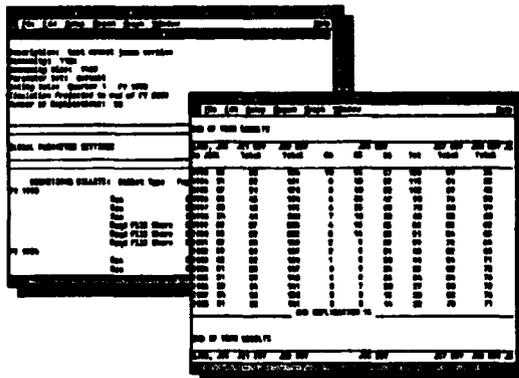
Product

- JSOMS
 - Utilizes current officer data including joint duty history and joint education
 - Models career paths (O-4 to O-7) of 16 officer communities
 - Permits "what if" analyses of policy alternatives
 - Produces graphs/reports interactively
 - Easy-to-use Windows interface

Joint Specialty Officer Modeling System (JSOMS)



Turn-Key Analysis



Applications

- Study the optimal size of Joint Duty Assignment List
- Study the impact of downsizing the Navy on Title IV compliance
- Identify bottlenecks in Joint Specialty Officer production

JSOMS

The Goldwater-Nichols's DoD Reorganization Act of 1986 focused on improving management and assignment of joint specialty officers, officers with training for and experience in joint duty assignments. The Act compelled all services to identify, train, and assign promotable officers to fill joint billets. Initially, the Navy had no systematic or streamlined method for determining whether it could comply with the new law.

Working with planners in BUPERS (PERS-455), NPRDC developed a model that evaluates the Navy's ability to train and staff its share of joint billets. The Joint Specialty Officer Modeling System (*JSOMS*) simulates the joint duty education and assignment processes to assess current or proposed joint duty requirements, policies, or rules. The model permitted BUPERS to develop alternative policies without unnecessarily disrupting the joint duty assignments.

By using *JSOMS*, BUPERS changed policies concerning the use of direct entry waivers, increased the number of critical occupation specialist "takeouts" (premature termination of a joint tour) utilized, and focused discussion with the Joint Staff and the Office of the Secretary of Defense on the bottlenecks that occur in the production of joint duty specialists. *JSOMS* also helped planners identify the best ways to meet joint duty requirements while minimizing the impact on warfare community manning.

JSOMS, installed in FY93, features an graphical user interface and a broad array of tabular and graphic reports.

Computer-Enhanced Detailing and Distribution (CEDAD)



Problem

- Detailers had no computerized tools to identify best assignments from hundreds of choices available under multiple, conflicting rules and policies

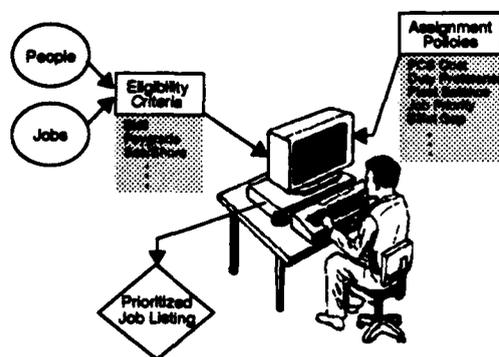
Approach

- Develop mathematical model and related databases to select all jobs for which an individual is eligible, ordered by policy.
- Rank order available jobs by policy priorities, including:
 - Minimizing PCS costs
 - Maximizing fill of high priority billets
 - Reutilize skills
 - Meet individuals' duty preferences

Product

- CEDAD

Computer-Enhanced Detailing and Distribution (CEDAD)



Contributions

- Significantly reduces time required to identify possible person-job matches
- Increases reuse of expensive skills
- Satisfies more duty preferences
- Supports detailer's negotiation with each sailor



Matching the Right Sailor to the Right Job . . .

CEDAD

Every sailor has a "detailer story"—what went right and what went wrong when negotiating a new assignment. More of these stories should have positive outcomes now, thanks to a powerful new decision support tool for detailers. Put simply, the Computer-Enhanced Detailing and Distribution (*CEDAD*) system matches sailors to jobs, Navy needs with individual wishes. *CEDAD* helps detailers make faster, less labor-intensive assignments; more efficient assignments; and provides sailors with greater job choices.

The Navy enlisted detailer's job is difficult. About 15,000 enlisted assignments are made each month by several hundred detailers. Detailers make these assignments while trying to obey: (1) hundreds of changing rules and regulations, (2) fluctuating personnel policies, and (3) constraints, such as limits on moving expenses.

Using *CEDAD*, detailers can retrieve, edit, and match descriptive data on sailors and jobs. They must still rely heavily on their own judgment and experience in making assignment decisions. However, much of the labor-intensive and costly work of repeated telephone calls and sifting through paper job listings and rule manuals has been alleviated. Using *CEDAD*, detailers are able to reduce the job search time for an average assignment from 30 minutes to 6 minutes. This efficiency contributed to BUPERS' reduction of the number of detailers from over 300 to around 200.

For the first time, *CEDAD* makes all job eligibility rules and policy objectives explicit and organizes them in a single database. For each sailor, *CEDAD* uses its database to generate a list of available jobs rank ordered by policy objectives (e.g., minimize moving costs, reuse skills). *CEDAD's* robust user interface allows detailers to tailor each individual assignment based on current policy priorities and a sailor's preferences, and obtain a list of alternative jobs—all during the course of telephone negotiations. These improvements mean greater reuse of skills that require expensive training (and therefore reduced training costs), fewer "gapped" jobs, and more satisfaction from sailors who have more choices.

CEDAD was tested thoroughly in several assignment branches and entered full-scale production for all skills in September 1993.

Recruiting Information Delivery System (RIDS)



Problem

- The Navy Recruiting Command lacked a centralized, consistent, and easy-to-access information system to support justification and allocation of recruiting resources

Approach

- Develop a responsive information system that supports recruiting market analysis, recruiter and advertising allocation and justification

Product

- RIDS
 - Contains current and historical demographic, economic, education, recruit production, and recruiting resources data by district/county, recruit attributes (e.g., quality, ethnic group)
 - Rapid retrieval of information
 - Easy to use, little training required
 - Tabular, graphic output
 - Contains Resource Allocation Model (RAM)

Recruiting Information Delivery System (RIDS)



1991 Qualified Military Available (QMA) Distribution



Applications

- PERS-23, CNRC analysts use RIDS to answer routine, ad hoc queries
- Recruiter allocation exercises
- Resource justification during Program Objectives Memorandum (POM) development
- Primary recruit market analysis tool



Meeting Recruiting Market Information Needs . . .

RIDS/RAM

The Navy must recruit more than 50,000 enlisted men and women annually to satisfy anticipated manpower requirements. To do so efficiently, the Navy Recruiting Command (NRC) must forecast local recruit market conditions, determine requirements for national and local advertising, and allocate a "sales force" of recruiters and support personnel across the country. These tasks require accurate historical data and reliable forecasts to predict resource needs and recruit availability for 35 recruiting districts. NPRDCs' Recruiting Information Delivery System (*RIDS*) meets that need.

As one recruiting analyst put it, "The automated data retrieval system provided by *RIDS* will bring us into the 21st century in terms of handling data. We are required to analyze vast amounts of information. *RIDS* reduces paper shuffling and data retrieval time."

RIDS is a centralized, consistent, and easy-to-use source of recruiting market data. It allows recruiting analysts to quickly query, retrieve, and display data on demographics, economic conditions, education status, recruit production, and recruiting resources. The information can be arrayed by quality, ethnic group, and recruit district.

RIDS also contains a mathematical model for allocating recruiters to districts. The Resource Allocation Model (*RAM*) helps conserve resources by finding the fewest number of recruiters needed to meet recruiting goals. *RAM* helped the Navy reduce its recruiter force from more than 3,400 in FY89 to fewer than 2,800 in FY93. By better allocating recruiters geographically, *RAM* is responsible for improved recruiter productivity, reduced recruiter failures to meet goals, and less recruiter stress.

Finally, *RIDS* helped recently to reorganize the district structure of the command. Using *RIDS* market data, NRC analysts were able to combine several districts and realign others leading to savings in overhead and operating expenses.

RIDS resides on a local area network at Headquarters, NRC serving over 20 users. A Delayed Entry Program management tool will be added to the system in FY94.

Defense Acquisition Workforce Improvement Act (DAWIA) Management Information System



Problem

- Navy Director of Acquisition Career Management (DACM) lacked key personnel information, sufficient staff, and automated tools to implement acquisition workforce plans, policies

Approach

- Develop computerized models and related databases to manage the acquisition workforce

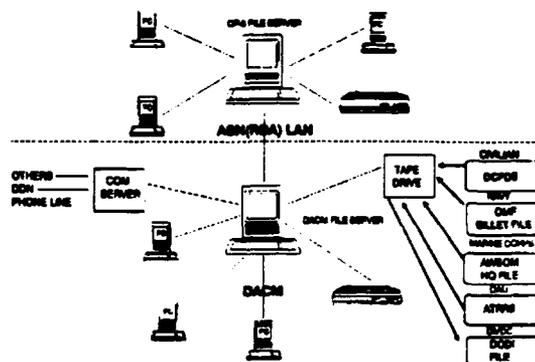
Products

- DAWIA Management Information System (MIS)
- Congressional reports and submissions

Defense Acquisition Workforce Improvement Act (DAWIA) Management Information System



DAWIA MIS Diagram



Applications

- Produce Congressional submissions
- Monitor compliance with public law
- Manage acquisition workforce
- Conduct policy analysis, workforce planning



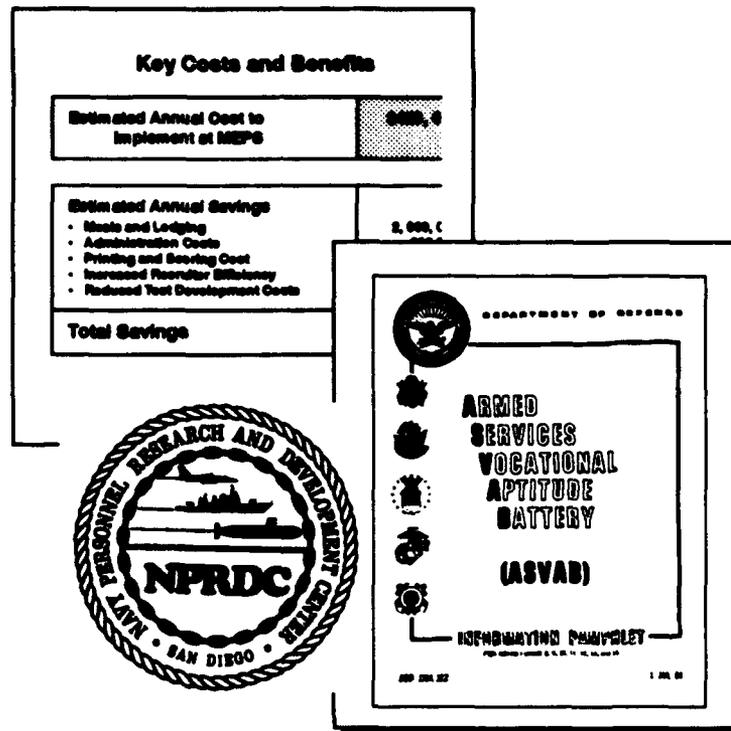
DAWIA MIS

Recently, the Defense Department and the Congress combined efforts to improve weapons system acquisition efficiency. The effort, formally embodied in the Defense Acquisition Workforce Improvement Act (*DAWIA*), focuses on selection, training, and assignment of professional acquisition personnel. An information system—*DAWIA MIS*, developed by NPRDC, helped the Assistant Secretary of the Navy (Acquisition) successfully identify, monitor, and train the Navy's acquisition workforce. The *DAWIA MIS* also helped satisfy complex status reports on the workforce mandated by Congress.

The *DAWIA MIS* contains a detailed career history database on all officer, enlisted, and civilian members of the acquisition workforce. The database reflects each individual's prior experience education, and training, information useful in determining future training needs and in making assignments. The *DAWIA MIS* will also be used to coordinate the planning, budgeting, and administration of the education and training of the workforce. Recently, the *DAWIA MIS* was used to produce the first set of Congressional reports on compliance with *DAWIA*. The Office of the Secretary of Defense was so pleased with the Navy's submission that it forwarded the reports to the other services as good examples.

Personnel

Develops and evaluates systems for recruiting, selecting, classifying, and utilizing military personnel to improve performance. Serves as the lead DoD R&D laboratory for the development of a Computerized Adaptive Testing version of the Armed Services Vocational Aptitude Battery (CAT-ASVAB).



Computerized Adaptive Testing-Armed Services Vocational Aptitude Battery (CAT-ASVAB)



Problems

- Inability to employ dynamic displays in tests
- Lengthy test administration time
- Standardized test administration procedures difficult to enforce
- Processing and scoring of tests take too long
- Susceptibility to theft and compromise
- High costs for printing, distribution, and storage
- Long lead-time and high cost of developing replacement forms

Approach

- Design, develop, test, and evaluate a psychometrically-effective CAT-ASVAB

Products

- Computer-based multiple aptitude test battery
- Microcomputer-based delivery system (hardware and software)

Computerized Adaptive Testing-Armed Services Vocational Aptitude Battery (CAT-ASVAB)



Key Costs and Benefits

Estimated Annual Cost to Implement at MEPS	\$425,000
---	------------------

Estimated Annual Savings	
• Meals and Lodging	2,000,000
• Administration Costs	300,000
• Printing and Scoring Cost	400,000
• Increased Recruiter Efficiency	1,000,000
• Reduced Test Development Costs	50,000
Total Savings	\$3,750,000

Estimated Annual Net Savings	\$3,325,000
-------------------------------------	--------------------

Applications

- Operational at five Military Entrance Processing Stations (MEPS)
- Manpower Accession Policy Steering Committee approved implementation in all MEPS throughout the continental U.S.
- Operational test and evaluation at Mobile Examining Team Sites (METS)



Cutting Test Administration Time and Costs . . .

CAT-ASVAB

The Armed Services Vocational Aptitude Battery (ASVAB) is used by all U.S. military services to determine enlistment eligibility and to classify selected applicants into entry-level training. Until June 1992, the ASVAB was administered only in a paper-and-pencil (P&P-ASVAB) mode. This conventional mode of test administration has a number of important shortcomings: (1) inability to employ dynamic displays in tests, (2) lengthy test administration time, (3) standardized test and administration procedures are difficult to enforce, (4) test processing and scoring take too long, (5) susceptibility to theft and compromise, (6) high costs for printing, distributing, and storing, and (7) long lead-time and high cost of developing replacement forms.

NPRDC developed, tested, and evaluated a Computerized Adaptive Testing (CAT) version of the ASVAB as a potential replacement for the P&P-ASVAB. *CAT-ASVAB* is a Joint-Service Program. The Department of the Navy is the Executive Agent, the Navy is the Lead Service, and NPRDC is the Lead Research and Development Laboratory.

Work has proceeded simultaneously in two areas: psychometric research and delivery system development. Five major field studies were completed. The results of these studies support the operational implementation of *CAT-ASVAB*. A sixth major research effort is in progress, the *CAT-ASVAB* Operational Test and Evaluation (OT&E). As part of this effort, *CAT-ASVAB* is operational at five Military Entrance Processing Stations (MEPS): San Diego, Los Angeles, Jackson, Baltimore, and Denver. *CAT-ASVAB* is implemented at one Mobile Examining Team Site (METS) in Washington, DC. Another MET is scheduled to be opened in the near future.

In May 1993, the Manpower Accession Policy Steering Committee approved implementation of *CAT-ASVAB* at all MEPS. The system works exceptionally well; OT&E results indicate that recruiters, MEPS personnel, and applicants are very favorable toward *CAT-ASVAB*. In fact, *CAT-ASVAB* users found advantages not initially expected: *CAT-ASVAB* allows greater flexibility in testing applicants. This was demonstrated when *CAT-ASVAB* was implemented in Los Angeles after the MEPS burned during the 1991 riots. *CAT-ASVAB* allowed the processing of large numbers of applicants even though limited facilities were available. *CAT-ASVAB*'s reduced test administration time can be a great benefit during mobilization.

The Office of the Assistant Secretary of Defense (Personnel and Readiness) sponsors the *CAT-ASVAB* program. Once *CAT-ASVAB* is fully operational for all military enlisted personnel selection and classification, the following benefits will result:

- Reduced administrative testing burden (including a significant reduction in testing time).
- Flexible test start times.
- Improved personnel processing under mobilization.
- Improved scoring accuracy and score availability to recruiters.
- Increased measurement precision.
- Reduced test compromise potential.
- Improved standardization of test administration procedures.

Armed Services Vocational Aptitude Battery (ASVAB)



Problems

- Identify applicants with greatest potential for first-term completion
- Assign selectees to training to maximize performance and minimize attrition
- Assure race/gender fairness

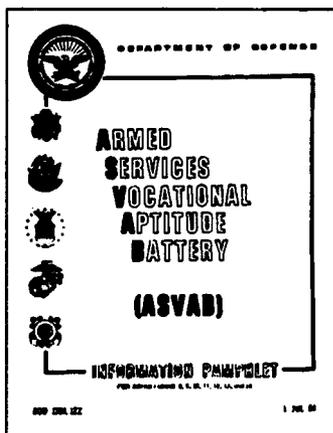
Approach

- Maintain performance database
- Relate ASVAB scores to performance
- Ensure standards optimize quality and minimize attrition
- Provide model for optimal school assignments

Products

- Automated ASVAB analysis system
- Recommendations for composites and cutoffs
- Test fairness analyses

Armed Services Vocational Aptitude Battery (ASVAB)



Applications

- Determine need for change in selection composites and standards
- Establish validity of selection composites for occupations
- Determine standards for females

Payoffs

- Substantial cost savings using optimal assignment
- Cost avoidance by reducing failures

ASVAB

All military services use the *ASVAB* as the primary instrument for selecting and classifying applicants for enlistment. Four of the battery's 10 tests are combined to form the Armed Forces Qualification Test (AFQT) score, which determines an applicant's eligibility to enlist, while 11 different combinations of the tests are formed into composites used to assign individuals to Navy class "A" schools. In a typical fiscal year, there are over 100,000 applicants tested for the Navy. Approximately 56,000 of these individuals are actually enlisted. Eighty percent of this group must be classified into approximately 85 Navy Class "A" Schools.

NPRDC works closely with the Recruiting and Retention Programs Division of the Bureau of Naval Personnel. Mutual goals are to (1) reduce training failures and the associated costs of attrition by ensuring the *ASVAB* composite scores are the best available predictors of successful "A" school completion, (2) improve job performance and fleet readiness by assessing the efficiency and fairness of *ASVAB* as a tool for Navy selection and classification, (3) provide psychometric support for Defense Manpower Data Center and the Manpower Accession Policy Working Group on *ASVAB*-related issues, (4) verify the equating of new *ASVAB* forms, and (5) evaluate new tests for possible use in the *ASVAB* battery.

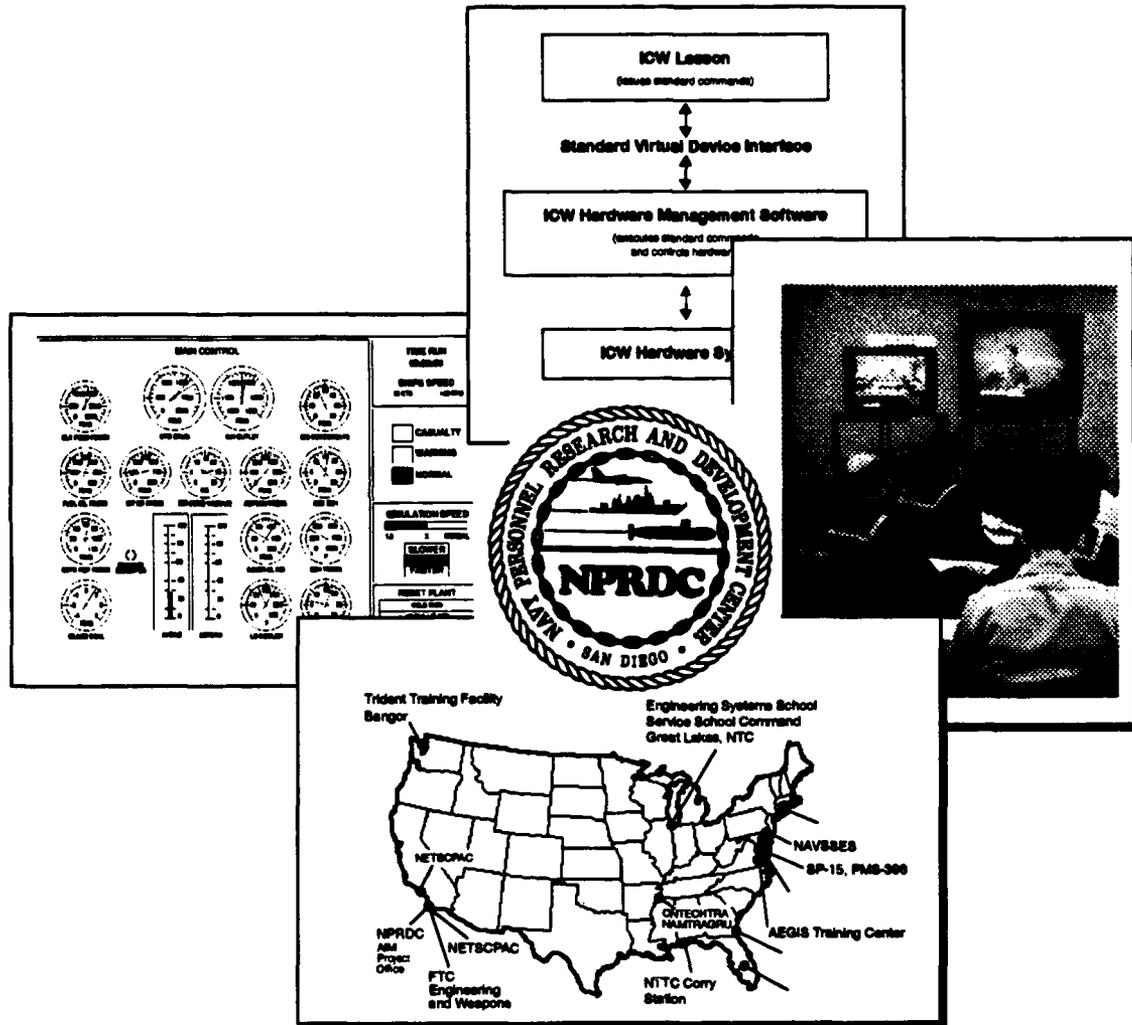
NPRDC developed an automated *ASVAB* analysis system. This new system will improve the response time in determining the need for changes to composites and standards and increase the efficiency in establishing selection composites for occupations. The system was used to conduct validation studies and complete analyses related to test fairness.

- Validation Studies: Opticalman, Boiler Technician, Machinist's Mate, Engineman, Interior Communications Technician, Mess Management Specialist, Ship's Serviceman, Weapons Technician, Hospital Corpsman, and 77 other ratings.
- Test Fairness: Provided female selection standards and contributed to a GAO inquiry.

Validated composites and standards ensure effective personnel assignments that lead to improved fleet readiness and performance. They also lead to reduced training failures and the associated attrition costs. Assurances of test fairness result in the optimal utilization of qualified females and minorities.

Training

Develops new educational and training technologies to reduce formal Navy training costs and to improve Navy training effectiveness.



STEAMER II: A Propulsion Engineering Simulator/Trainer



Problem

- Existing Naval Reserve Force propulsion engineering training is not capable of qualifying/requalifying drilling reservists

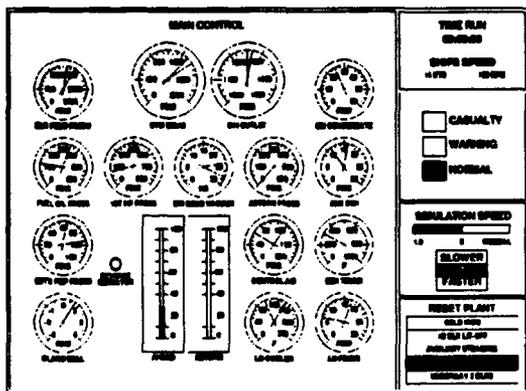
Approach

- Design, develop, install, and evaluate low cost, model-based, high resolution graphical simulation technology that prepares Naval Reserve propulsion engineers for rapid certification as underway watchstanders

Products

- FF-1052/1078 class frigate 1200 lb Steam Plant Simulation running on a 486/33 PC computer
- Classrooms and laboratory training system configurations (supports individual and team training)
- Simulation specific Engineering Operational Sequencing System (EOSS) and Engineering Casualty Control (ECC) documents and related training materials
- FFG-7 class frigate Gas Turbine simulation (currently under development)

STEAMER II: A Propulsion Engineering Simulator/Trainer



Applications

- Ten Naval Reserve Readiness Centers have received STEAMER II training systems (1200 lb Steam plant version)
 - Brooklyn, NY—Denver, CO
 - Richmond, VA—Kansas City, MD
 - Orlando, FL—Mobile, AL
 - Houston, TX—Bessemer, AL
 - Columbus, OH—Long Beach, CA
- Training effectiveness testing to begin as part of quarterly/annual on-board training duty for designated reservists
- STEAMER II was evaluated by the Taiwan Navy and is expected to be part of a FF-1052 class ship acquisition package initiated through foreign military sales



Increasing Training Readiness . . .

STEAMER II

STEAMER II is an innovative 1200 lb steam plant simulator/trainer that allows marine propulsion engineering personnel to practice plant operations and casualty control procedures. A high resolution graphical interface allows users to control the model through icons that represent the various valves and automatic boiler controls used onboard ship.

STEAMER II allows the instructor or student to switch rapidly between different plant locations, to demonstrate and observe the results of a specific action, or to examine cause and effect relationships. A classroom version uses a video projection system to assist instructors in graphically illustrating plant operations and the effects of system casualties. Instructors use the visual aspects of **STEAMER II** to explain system operations and to monitor the procedures used to ensure plant and personnel safety.

STEAMER II can also be used as a procedures trainer for up to four networked stations. Training is conducted using a series of workbooks, Engineering Operational Sequencing System (EOSS), and Engineering Casualty Control (ECC) manuals. In a single user mode, the trainee performs all system alignments and related tasks to bring the plant from cold iron, to one boiler lit-off, to auxiliary steaming, through one and two boiler underway operations. In a network mode, trainees are assigned to watch stations and perform the EOSS and ECC functions relating to that watch station. Trainees log into the network as the engineering officer of the watch (EOOW), fire room watch, machinery room watch, and auxiliary room watch. Each station performs EOSS and ECC tasks as part of a team evolution. Watchstanders perform as directed by the EOOW and report to the EOOW when assigned tasks are completed. While in the network mode, the EOOW can select and insert one of a variety of system casualties and then observe how individual watchstanders react to the casualty.

Production-level **STEAMER II** training systems are installed at several Naval Reserve training sites. The introduction of **STEAMER II** into reserve training is expected to:

- Increase training readiness of engineering personnel.
- Provide remote site training in propulsion engineering.
- Provide enhanced standardized instruction in the theory and operation of a 1200 lb steam plant.
- Improve propulsion engineering instruction/training.

Interactive Multidimensional Acoustic Trainer (IMAT)



Problem

- Current training does not provide dynamic aspects of complex passive acoustic analysis (PAA), active target return interpretation, and ocean environmental prediction tasks to train antisubmarine warfare (ASW) operators and tacticians

Approach

- Develop a multi-use concept display training aid

Product

- 4 IMAT Centered Training Programs
 - Functional skills acoustic analysis training
 - Submarine operations training
 - Ocean environment training
 - Sonobuoy receiver training

Interactive Multidimensional Acoustic Trainer (IMAT)



Applications

- Aviation Antisubmarine Warfare "A" School
 - Ocean environments
 - Full spectrum passive/active
- Fleet Aviation Specialized Operations Detachment, Barbers Point
 - Tactical oceanography
 - Search planning
- Sea-Based Weapons and Advanced Tactics School (SWATS), North Island
 - Tactical oceanography
 - Search planning



Training Tacticians and Acoustic Operators. . .

IMAT

The Interactive Multidimensional Acoustic Trainer (*IMAT*) is a multi-use concept display training aid. It provides three-dimensional visuals that emphasize cause and effect relationships among source signal, environment, receiver, and processed displays required for high quality apprentice-through-master level operator training. Successful performance of complex tasks associated with undersea warfare depends on well trained tacticians and acoustic operators. Numerous research studies by NPRDC identified deficiencies in task performance for passive acoustic analysis (PAA), active target return interpretation, and ocean environmental predictions. These critical tasks share elements of task complexity which require sensor operators to understand multiple knowledge domains; integrate threat, environment, and system component information; and achieve problem solution through reasoning rather than performing by rote, memorized procedures.

Traditional instruction in these complex tasks is limited by training materials that provide two-dimensional representations of multidimensional phenomenon. The inability to provide visual and flexible exemplars of the dynamic aspects of these tasks frustrates instructors. Students find the complicated relationships among the task components extremely difficult to understand. As a result, an operator's primary skill is in memorizing academic descriptions of physical phenomena, specific parametric data, and procedural tasks. Recent changes in world threat have substantially diminished real-world practice. Reliance on Fleet-gained experiential skills to complete the procedurally-based formal schoolhouse training is becoming increasingly inefficient in producing qualified operators and tacticians.

IMAT provides (1) functional skills acoustic analysis training by graphically displaying internal and external emitter sources coupled with the corresponding aural and Lofargram signatures; (2) submarine operations training by visually associating acoustic vulnerabilities with various submarine operating characteristics using three-dimensional dynamic displays; (3) ocean environment training by dynamically displaying the interrelationships among submarine position in the water column, environmental conditions, and receiver location; and (4) sonobuoy receiver training by graphically illustrating the beam-forming characteristics of various sonobuoys to demonstrate the tactical advantages of pairing receivers to source locations within a range of environmental conditions.

IMAT supports the following sites: Aviation Antisubmarine Warfare (AW) "A" School, Fleet Aviation Specialized Operations Detachment, Mofett, and Sea-Based Weapons and Advanced Tactics School (SWATS). Although existing *IMAT* plans clearly focus on an air implementation, the software architecture and programming strategy can accommodate surface, subsurface, and fixed-site communities, tactical environments, and Lofargram display specifications.

Technical development was provided by the Advanced Prototype Section of the Naval Surface Warfare Center. The technology was briefed to the White House Office of Science and Technology policy to consider its application to civilian education.

Videoteletraining (VTT)



Problem

- Navy personnel onboard remotely located ships, in the reserves, and at strategic ports require quality training even when located away from training resources/centers

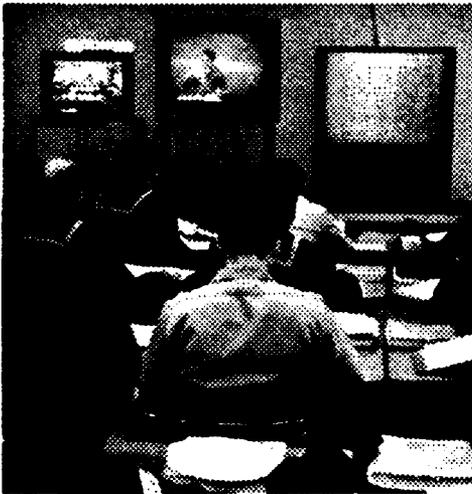
Approach

- Explore distance learning technologies through laboratory studies, demonstration projects, and surveys of technology users

Products

- Videoteletraining (VTT) video fidelity/cost effectiveness study
- Guidelines for the use of advanced technologies within the VTT classroom
- Demonstration of VTT with hands-on and Naval leadership training

Videoteletraining (VTT)



Applications

- VTT laboratory at Fleet Training Center, San Diego
- West coast VTT demonstration
- Surveys of evolving communication technologies and of VTT systems in public education, industry, and the military

Findings

- VTT is effective for training and accepted by students and instructors
- VTT can work beyond instructor-centered, lecture-based training (e.g., for courses with hands-on laboratories, small group interactions, and other training processes)
- Interactivity is the key to effective VTT



Training Students at Remote Sites. . .

VTT

NPRDC develops and evaluates cost-effective methods to train students at remote sites (e.g., onboard ships, in reserve centers, at home ports, and other remote locations). Early work included technology demonstration projects, a survey of current technology and applications, and laboratory studies. FY93 work applied videoteletraining (*VTT*) technology beyond lecture-based instruction to courses with hands-on laboratories, small group interactions, and other training processes.

NPRDC used its *VTT* research laboratory at the Fleet Training Center, San Diego, to conduct a series of controlled experimental studies of distributed training technology. The first study investigated the relative training effectiveness and acceptance by students and instructors of live instruction and several alternative forms of *VTT*. Findings were that student test performance and acceptance of instruction were equivalent in conditions providing 2-way audio (live instruction, 1-way video, 2-way video), but that test scores and acceptance suffered when 2-way audio interaction was not possible.

The second study investigated the feasibility of using *VTT* to deliver training involving a significant hands-on laboratory component. Knowledge and performance test scores were equivalent in live and *VTT* conditions, indicating the feasibility of using *VTT* for hands-on training.

The third study investigated the feasibility of using *VTT* to deliver naval leadership training-facilitated instruction involving small groups and high levels of instructor-student and student-student interaction. This was the first attempt to deliver this type of intense training via *VTT* and uncovered several problems, though it demonstrated the feasibility of the basic concept.

In the fall of 1992, the Chief of Naval Education and Training established its Electronic Schoolhouse Network (CESN) on the west coast, with the hub at the Fleet Training Center in San Diego and remote sites at Treasure Island and Bangor, Washington. A new *VTT* laboratory consisting of two classrooms was established at the hub with the ability to broadcast and receive training via the CESN. This laboratory will conduct studies to extend the utility of *VTT* beyond instructor-centered, lecture-based training for which it has traditionally been used. *VTT* Laboratory courses include: naval leadership training, fiber optic cable repair, and celestial navigation. Significant savings in transportation, per diem, instructor time, and time away from primary duty are anticipated.

Authoring Instructional Materials (AIM)



Problem

- Lack of effective methods for producing and revising instructional materials for Navy courses

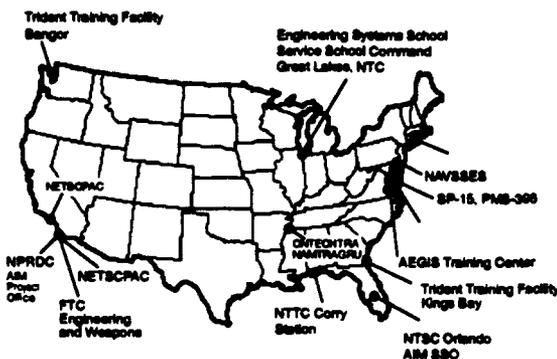
Approach

- Design, develop, and evaluate an automated system for the analysis, design, development, and maintenance production of instructional materials

Product

- An authoring system that works with Oracle, a commercial relational database and UNIX standard Navy computer systems

Authoring Instructional Materials (AIM)



Applications

- AIM is being used at a number of sites for course planning and production
- Navy Training Systems Center was designated as AIM System Support Office to implement AIM Navy-wide

AIM

Authoring Instructional Materials (*AIM*) is an automated system for analysis, design, development, and maintenance of instructional materials for conventional and computer-delivered courses. With the support of two contracting firms, NPRDC researchers worked with over 20 different training sites throughout the country to design and evaluate *AIM* curriculum development and maintenance software. *AIM* was used to produce instructional materials at many different sites, such as Service School Command, Great Lakes; Submarine Training Facility, Charleston, SC; Aegis Training Center, Dahlgren; Corry Station, Pensacola; Strategic Programs, SP-15, Washington, DC; and the Naval Sea Systems Command, Washington, DC.

Throughout the Navy, instructors teach over 7,000 different courses. Each course requires on-going production and revision. NPRDC developed *AIM* as a state-of-the-art electronic process. Without *AIM*, materials for 1 hour of instruction require from 100 to 1,000 highly experienced personnel hours to develop. By reducing the time required to develop and maintain equipment-based courses, *AIM* significantly reduced curriculum development and maintenance costs. Expected annual savings from wide application of *AIM* could reach \$4.5M.

AIM automated curriculum development, production, and maintenance:

- Decreases curriculum development time by 30 to 50 percent.
- Decreases lag time by 6 to 12 months from fleet equipment changes to training materials update.
- Provides the basis for future electronic curricula.
- Allows scarce subject matter and instructional design-experts to produce high quality instruction efficiently.

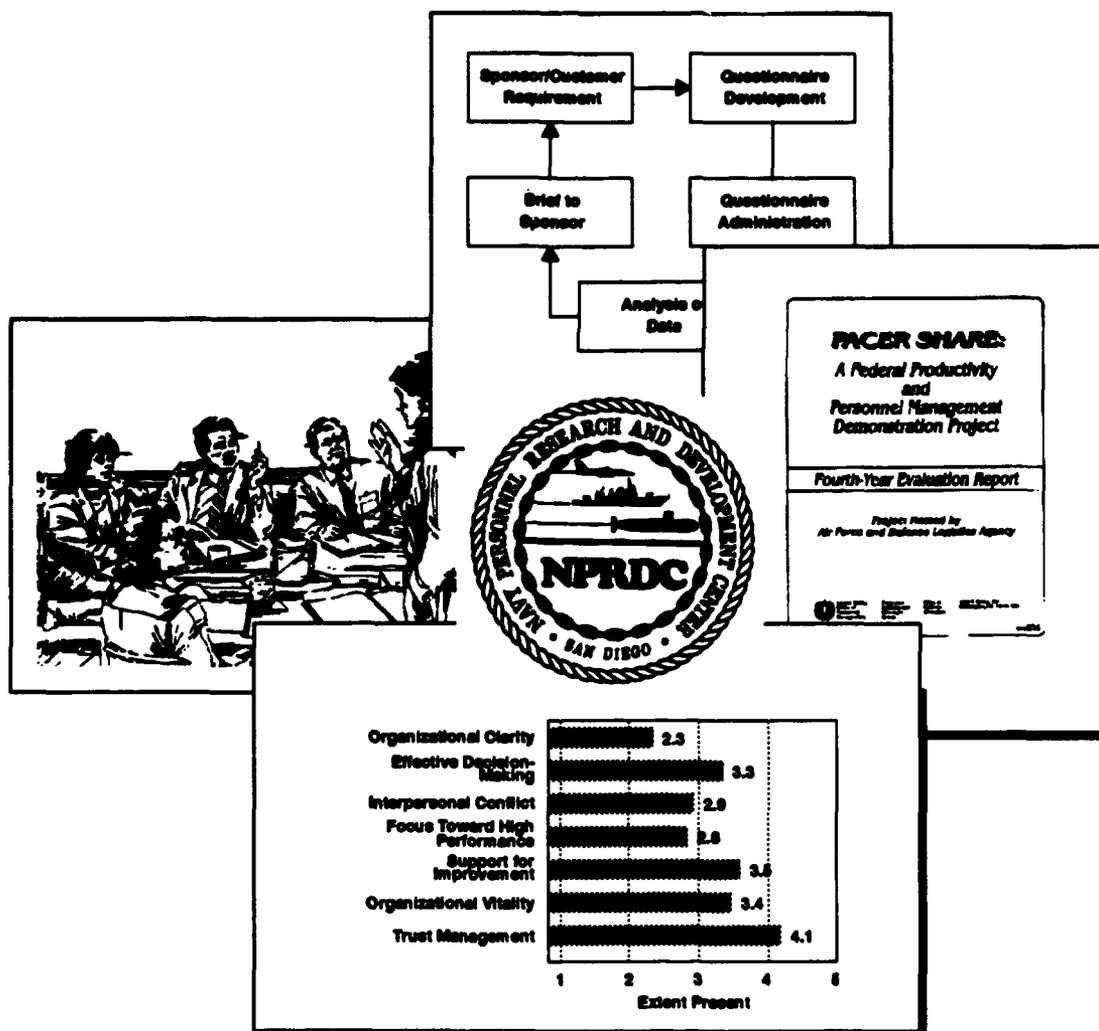
In December 1992, after the Chief of Naval Technical Training (CNTT), Memphis, tested and evaluated *AIM*, *AIM* passed operational evaluation. The Navy Training Systems Center (NTSC), Orlando, was designated as the *AIM* System Support Office (SSO) to guide the implementation of *AIM* Navy-wide.

Throughout FY93, NPRDC assisted the SSO. NPRDC is also working to enhance the *AIM* software to comply with DoD Computer-Aided Acquisition and Logistics Support (CALS) standard test known as Standard Generalized Markup Language (SGML). Once the instructional materials are SGML tagged, curriculum developed by *AIM* software can be another input source for Paperless Classroom (a current NPRDC project developing instructor aids for classroom training).

The *AIM* SSO conducted an economic analysis comparing *AIM* implementation with the current manual method. Estimated cost avoidance for a four year period (1993-1996) was found to be over \$14M.

Organizational Systems

Develops and evaluates performance enhancement and control systems for improving the effectiveness, quality, and productivity of defense personnel and organizations. Develops approaches for managing a diverse work force. Serves as the Chief of Naval Operations' primary resource to coordinate and conduct attitude surveys in the Navy and Marine Corps and to develop new survey technology.



Navy-Wide Personnel Survey (NPS)



Problem

- No systematic procedure existed for policy makers and program managers to obtain attitude and opinion information

Approach

- Omnibus
- Tailored to sponsor's needs
- Representative random sample of 5% enlisted and 10% officers
- Sample projected to Navy population
- Fast survey feedback to sponsor

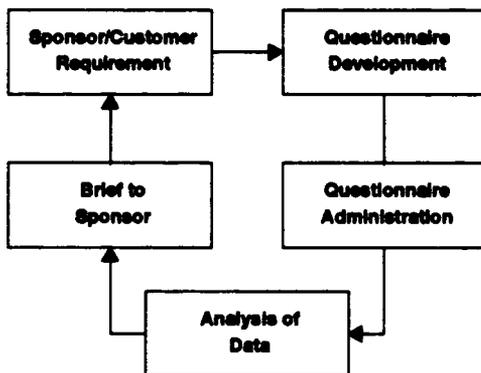
Products

- Statistical reports
- Trend Analysis
- Briefings
- Special in-depth analyses

Navy-Wide Personnel Survey (NPS)



Start to Finish: Four Months



Applications

- Testimony before Congress and Subcommittees
 - Sexual harassment
 - Pay and benefits
 - Housing
 - Morale, welfare, recreation
- Plan, evaluate, and revise personnel policy/programs



Collecting Opinion Data for Policy Makers . . .

NPS

The morale and job performance of Navy members take on added importance in an era of economic uncertainty, profound social changes, and military down sizing. Each individual must contribute to the increased efficiency required of a reduced force in a still-hostile world. Navy members' attitudes and opinions are vital to the development and continuous improvement of Navy policies and programs. Therefore, these attitudes must be measured systematically and timely to furnish an accurate reflection of the views of its diverse and widespread membership.

The annual Navy-Wide Personnel Survey (*NPS*) is designed to collect opinion data systematically and to provide timely information on issues of importance to policy makers. The survey has been administered three times (December 1991, 1992, and 1993). The annual sampling, consisting of approximately 5% of the enlisted population and 10% of the officer population, is representative of the entire Navy. Using scientifically designed samples that can be projected to the total Navy population or cohorts, the *NPS* is a most effective way to collect attitude and opinion data. The survey is designed to allow the identification and analysis of trends in opinions and attitudes toward plans, programs, and policies affecting Navy member performance and morale. The survey also accommodates the study of compelling special interest topics. Survey results from previous years helped to justify increases in funding for family and bachelor housing, child care, relocation assistance, and enlisted clubs.

NPS-92 Highlights

- Eight-three percent of officers and 67% of enlisted are happy with their current assignment. The most common reason cited by unhappy enlisted personnel was *geographical region*. The largest group of unhappy officers cited *not getting the billet they wanted*.
- Approximately three-fourths of members are satisfied with their current child care arrangements and slightly over half indicate that child care concerns never or rarely interfere with their job performance. The major reasons for not using military child care were *waiting list* and *location*.
- For both males and females, there is a steady increase in the belief over the past three years that the Navy is improving equal opportunity. Officers more than enlisted are satisfied with equal opportunity, and within the officer group, males are more satisfied than females.
- Over 94% said they understand sexual harassment definitions, regulations, and their rights and responsibilities. More than 60% of the respondents felt that the sexual harassment stand down was helpful.
- Over 80% agree with the Navy's alcohol policy and over 90% agree with the Navy's zero-tolerance drug policy. Enlisted personnel agree less than officers that drug and alcohol regulations are enforced fairly.
- In 1991, 62% of officers and 48% of enlisted planned to stay in the Navy. In 1992, the percentages were 58% and 42%, respectively. For enlisted, members most likely to stay included males, blacks, "other" racial groups, and members assigned to shore duty. For officers, those most likely to stay included females, blacks, and members assigned to shore duty.

Total Quality Leadership (TQL) Courseware Development



Problems

- TQL is a management approach that requires considerable up-front education and training; Commands were finding their own sources of training, thereby creating variation in approaches
- Education and training sources were not available or tailored to DoN requirements—available courses used different approaches and terminology
- Available commercial courses for teaching the graphic methods and tools resulted in ineffective process improvement activities

Approach

- DoN decided to build an "in-house" training capability
- DoN Executive Steering Group chartered NPRDC to develop 3 courses for the TQL curriculum

Products

- Senior Leadership Seminar (SLS), 1991
- Fundamentals of TQL (FTQL), 1992
- Systems Approach to Process Improvement (SAPI), 1993

Total Quality Leadership (TQL) Courseware Development



Applications

- SLS and FTQL are currently being taught at the TQL schools in Coronado, CA and Little Creek, VA.
- SAPI goes on line in the fourth quarter of FY93

TQL Courseware Development

In 1990, Department of the Navy (DoN) leaders recognized that some fundamental changes had to be made in the way we conduct business if we are to maintain our level of readiness in a downsizing environment. Based upon preliminary research in quality management conducted by NPRDC at various naval activities (e.g., aviation depots, shipyards, supply centers), positive results reported in private industry, a number of success stories in DoN activities, and support from key Navy leaders, the DoN decided to adopt a management system focused on total quality.

At the direction of the Secretary of the Navy, a high level Executive Steering Group (ESG) was formed to oversee the "implementation" of Total Quality Leadership (TQL) throughout the DoN. The ESG was chaired by the Undersecretary of the Navy and its membership included high ranking shore activity commanders and assistant secretaries.

The ESG believed that education on TQL concepts and methods was essential to a successful total quality transformation. The members also believed that the organization had to build an "in-house" capability to ensure that (1) the concepts and delivery of those concepts would be consistent across the Department, (2) the quality of instruction and materials would be manageable, and (3) costs could be contained. To make this happen, the ESG formed an Education and Training Advisory Group in 1991, chaired by the Chief of Naval Education and Training, which developed a Department-wide TQL education and training program. The program included establishing TQL schools at Coronado, CA, and Little Creek, VA; selecting and training a cadre of *TQL specialists to form the faculty* of these schools; and developing a core curriculum.

NPRDC developed three of six core courses:

- Senior Leaders Seminar (SLS).** Given the top-down nature of TQL, SLS was the first course developed. The four and a half day seminar was designed to educate top leaders of DoN organizations, COs, XO's, and/or civilian equivalents (i.e., O-6 through O-8 and SES), on TQL principles.
- Fundamentals of Total Quality Leadership (FTQL).** A four day course describing the DoN's approach to TQL. FTQL is the first course in the DoN TQL curriculum to be taken by command TQL coordinators and quality advisors. It serves as the foundation for all other DoN TQL courses. FTQL is an education course; the remaining courses in the DoN TQL curriculum are training courses based on the concepts presented in the FTQL course.
- Systems Approach to Process Improvement (SAPI).** A ten day course designed to give quality advisors the knowledge and skills they need to advise and assist teams in applying quantitative methods and tools to process improvement. Quality advisors then teach, coach, and assist process improvement teams with their process improvement activities. The quantitative methods and tools taught are the traditional seven quality control tools. They include: flow charts, Pareto charts, cause-and-effect diagrams, histograms, scatter diagrams, run charts, and control charts. A unique and important aspect of SAPI, when compared to commercial courses covering the same material, is that the methods and tools are presented in the context of an extended customer-supplier system model.

Total Quality Leadership (TQL) Organizational Self-Assessments



Problems

- Navy and Marine Corps leaders require indicators to monitor and guide the TQL transformation
- Tools required to aid leaders in the transition from the classroom to the field
- Shrinking budgets require commands to find cost-effective measurement systems

Approach

- Content analyzed DoN TQL Courses (SLS and Implementation Seminar)
- TQL experts validated measures
- Pilot tested surveys and collected customer feedback
- Revised surveys based on customer input and psychometric evaluation
- Developed telephone and survey administration/analysis support systems

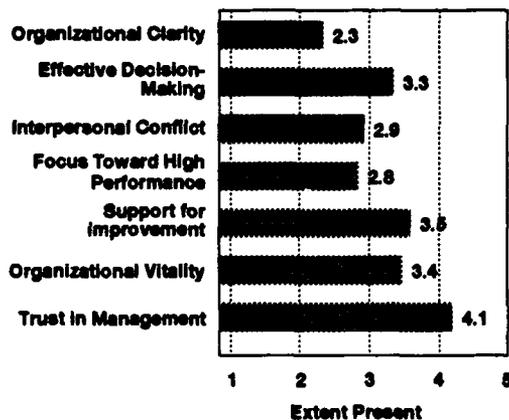
Products

- Transformation Activity Orientation Survey (TQIS)
- Total Quality Leadership Climate Survey (TQLCS)

Total Quality Leadership (TQL) Organizational Self-Assessments



General Organizational Climate



Applications

- TQIS
 - Provides rotating military personnel with rapid orientation of TQL effort at new command
 - Establishes a basis for TQL strategic planning
- TQLCS
 - Provides a quick, cost-effective method for Navy organizations to assess organizational climate
 - Appropriate for current assessment and to track progress over time
 - Designed for use in wide variety of military organizations



TQL Organizational Self-Assessments

Navy and Marine Corps leaders require tools to monitor and guide their TQL implementation efforts. Shrinking budgets require that support materials and progress indicators be efficient and cost-effective in the field.

Under the sponsorship of the DoN's TQL Office in Washington, DC, NPRDC developed two surveys: **Total Quality Implementation Survey (TQIS)** and **TQL Climate Survey (TQLCS)**. TQL experts validated the measures, and both surveys were pilot tested. Both surveys were finalized based on the pilot test results, feedback from users, and a psychometric evaluation.

- TQIS.** An internally administered and analyzed survey, designed to aid a new CO and the command's Executive Steering Committee (ESC). TQIS has two primary objectives: (1) to orient the new CO and the ESC regarding the level of TQL transformation activities in the organization and (2) to help the CO and ESC identify required TQL implementation activities.

TQIS surveys the ESC's perceptions of key TQL transformation activities in eight categories: (1) leadership, (2) strategic planning, (3) customer focus, (4) supplier relationships, (5) TQL team structure, (6) team dynamics, (7) education and training, and (8) quantitative tool use. ESC members are asked to rate the level of TQL implementation on a scale ranging from 1 (no TQL implementation) to 5 (full TQL implementation).

Use of TQIS falls into three phases: data collection, data analysis, and data interpretation. TQIS is specifically designed to respond to the need to quickly orient rotating military personnel to the TQL implementation efforts at their new commands and to provide a basis for strategic planning for the transformation to a TQL organization.

- TQLCS.** A diagnostic tool designed to support an organization's transformation toward TQL. The survey measures employee and management perceptions and attitudes about the organization. It is designed to be used periodically for internal assessment.

The TQLCS consists of 164 questions or statements. They fall into six broad content categories: (1) general organizational climate, (2) work team functioning, (3) worker motivation, (4) job characteristics, (5) TQL implementation, and (6) TQL support. In addition, the TQLCS offers each organization the ability to add ten questions of their own.

To provide Navy and Marine Corps organizations with access to the surveys, a survey administration and analysis system was developed. TQIS is comprised of a set of forms and guidelines for their use. Organizations request the package of materials and administer TQIS at their sites. Telephone support or on-site consulting and facilitation is provided (on request) by NPRDC. TQLCS is provided to organizations by NPRDC, the surveys are administered by site personnel, and the completed surveys are returned to NPRDC for machine scanning and analysis. A detailed analysis and response summary is provided to each site. Telephone support and on-site administration and consulting are also available for TQLCS.

PACER SHARE Demonstration Project Evaluation



Problems

- The existing civil service system does not facilitate the use of TQL
- Organizational innovations are not objectively evaluated to determine their impact, worth, and application to other sites

Approach

- Conduct a comprehensive evaluation of the effects of PACER SHARE Federal Productivity and Personnel Management Demonstration Project
- Use multiple measurement methods
- Consider characteristics of the implementing site and the way in and extent to which planned changes are implemented
- Examine project effects at a variety of levels—from work processes to overall organizational outcomes

Product

- PACER SHARE: A Federal Productivity and Personnel Management Demonstration Project, Fourth-Year Evaluation Report

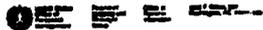
PACER SHARE Demonstration Project Evaluation



PACER SHARE:
*A Federal Productivity
and
Personnel Management
Demonstration Project*

Fourth-Year Evaluation Report

*Project Hosted by
Air Force and Defense Logistics Agency*



Applications

- Used at project site to improve on-going project
- Used by project sponsors to consider wider application
- Considered by DoD for adoption
- Used by Office of Personnel Management to determine potential civil service policy reform

PACER SHARE

Due to declining budgets and increasing pressures to improve operation efficiency and productivity, Federal Agencies are adopting new management approaches and changing the way they do business. The short-term and long-term effects of these changes on organizations and their employees, however, are often not objectively and systematically examined. Failure to examine these effects can lead to the continuation of inefficient, unproductive practices or lost opportunities for sharing successful approaches with other organizations.

One approach adopted by Federal agencies and private industry to meet increased efficiency and productivity goals, is Total Quality Leadership (TQL). Implementors of this approach have concluded, however that TQL could be more successful if the civil service system was changed to accommodate TQL practices. In an effort to adopt TQL and to create an organizational and personnel system supportive of TQL, a 5-year Federal demonstration project was conducted at a military material distribution center in Sacramento, CA. The project—the *PACER SHARE* Federal Productivity and Personnel Management Demonstration Project—provided for a 5-year test of a modified personnel management system and for an objective, comprehensive evaluation of project effects and its potential for wider use. An NPRDC research team is performing the fourth- and fifth-year summative evaluations for the Pacer Share project.

The *PACER SHARE* project was designed to implement and test a more flexible, responsive, and streamlined personnel system and new employee motivation techniques to improve organizational performance. The package of changes included such initiatives as the use of paybanding, the elimination of individual performance appraisals, and an organization-wide productivity gainsharing system. The project required a fundamental change in the way business was conducted and the manner in which employees viewed their work and coworkers.

The evaluation approach has employed multiple measurement methods and a comprehensive approach to examining the project's success. Project outcomes were examined with respect to the implementation site (e.g., constraints or advantages specific to that site) as well as to the way planned organizational changes were implemented. Further, the project outcomes were considered on a variety of levels, ranging from small scale impacts on work processes to organization-wide outcomes (e.g., overall organizational productivity). Finally, the subjective effects (e.g., employee attitudes about the project, morale, and commitment to the organization) were considered with the objective project impact indicators.

Fourth year evaluation results were reported in *Pacer Share: A Federal Productivity and Personnel Management Demonstration Project, Fourth-Year Evaluation Report*. The report provided project participants information about the project's status and ways to improve the project, and gave the project's sponsors (the Air Force and Defense Logistics Agency), as well as the Navy, Army, and DoD Headquarters organizations, objective project information. The Office of Personnel Management (OPM), which has oversight authority for all Federal demonstration projects authorized under Title IV of Civil Service Reform Act, used the evaluation results to consider the implications of the project's outcomes for civil service policy and reform. The systematic project evaluation and results dissemination allowed broad government segments to benefit from an innovative personnel management system experiment. OPM has declared NPRDC to be the preferred provider for program evaluations relative to demonstration projects.

Integration of Women



Problem

- Pregnancy and single parenthood believed to affect Navy mission
 - Cause an undue amount of lost time
 - Negative impact on work groups, commands, and personnel systems

Approach

- Document absence behavior with diaries
- Conduct surveys to estimate rates of pregnancy/single parenthood
- Analyze personnel records and policy implementation

Products

- Biennial Survey of Pregnancy and Parenthood
- Flag and SecNav briefings; Presidential Commission
- Technical reports, journal articles, and book chapters

Integration of Women



Applications

- Revisions to pregnancy and single parenthood policies
- Expanded opportunities for military women
- Monitoring rates of pregnancy and single parenthood



Integration of Women

In the past 15 years, the representation of women in the Navy has grown from 2% to 10% of the enlisted force. Greater utilization of women resulted in new personnel issues; none of which is more thorny or emotional than pregnancy. After the DoD policy of discharging pregnant women was discontinued, complaints about the impact of pregnancy and motherhood on productivity, readiness, and time lost from work escalated.

The perception that an unreasonable number of Navy women are pregnant and single is widespread among military personnel. In recent discussions about removing the combat exclusion law, pregnancy was raised as a rationale for not allowing women into combat billets. A related concern about mission accomplishment was expressed about parenthood, especially single parenthood. The mobilization of military personnel during Operation Desert Shield/Storm raised questions about sending single parents and dual military couples into battle. Did such parents have adequate child care arrangements? Would parenthood responsibilities prevent some military personnel from being mobilized?

NPRDC's *Lost Time of Men and Women* research project was designed to provide Navy leadership with the information needed to manage pregnancy and single parenthood. Estimates of point-in-time pregnancy and single parenthood rates were developed by means of surveys that were administered in 1988, 1990, and 1992. The results indicated that Navy women are very similar to their civilian age cohorts in regards to their pregnancy rates. Rates of single parenthood, however, are higher in the Navy than among civilians for both genders.

The impact of pregnancy and single parenthood on work groups, commands, and personnel systems was investigated. Absences of enlisted personnel were documented and analyzed for differences due to gender and parental status. Although pregnant women lost more time than other personnel, the absences of enlisted women in the Navy did not differ from those of men except for shore commands where pregnant women from ships are assigned in excess. The absences of single parents were only slightly higher than those of married parents. Pregnancy was shown to have a greater impact on afloat than ashore commands, in terms of premature losses and perceptions of supervisors. Neither single parents nor pregnant women were found to have a meaningful impact on the accession, assignment, or separation systems.

The Navy is gradually moving toward gender-neutral accession and assignment policies. Research on the integration of women provides factual data that can be used to avoid incipient problems and maintain a high level of readiness. Findings from the *Lost Time of Men and Women* research influenced DoD and Navy policy during FY93 and contributed to expanding roles for women in the military.

Navy Equal Opportunity Surveys



Problem

- Navy lacked accurate information about equal opportunity climate perceptions and occurrence of sexual harassment

Approach

- Navy-wide equal opportunity and sexual harassment survey administered to active duty samples in 1989 and 1991
- Command-level equal opportunity survey developed for annual command equal opportunity surveys

Products

- Navy Equal Opportunity and Sexual Harassment (NEOSH) Survey
- Command Assessment Team Survey System (CATSYS)

Navy Equal Opportunity Surveys



Applications

- The NEOSH Survey is Navy's official measure of equal opportunity and sexual harassment issues
- The CATSYS computer program, to be distributed by Chief of Naval Education and Training, will assist commands with equal opportunity surveys



Monitoring Equal Opportunity Policies . . .

Navy Equal Opportunity Surveys

As diversity becomes an increasingly important Navy concern, there is heightened interest in assessing the perceptions of Navy personnel regarding equal opportunity (EO) and sexual harassment. Two surveys in particular address these concerns: the Navy Equal Opportunity and Sexual Harassment (NEOSH) Survey and the Command Assessment Team Survey System (CATSYS).

At the Navy-wide level, the NEOSH Survey is a biennial assessment of EO climate and the occurrence of sexual harassment. The first part of the NEOSH Survey assesses EO in 11 content areas. The second half of the NEOSH Survey focuses on sexual harassment and its frequency among active-duty, Navy personnel. The data gathered from the first two administrations (1989 and 1991 NEOSH Surveys) provided baseline information for future survey data comparisons. (The 1993 NEOSH Survey will be administered in October 1993.)

NEOSH Survey findings provide policy-makers with an empirical method for monitoring and continually improving Navy EO policy. Survey results were briefed to the Chief of Naval Operations, the Chief of Naval Personnel, and the Undersecretary of the Navy. During the intense media focus on sexual harassment in the aftermath of the Tailhook scandal, the NEOSH Survey sexual harassment findings were quoted in numerous publications and newspapers including the *New York Times*.

While developing the Navy-wide NEOSH Survey, NPRDC found that individual Navy commands needed easy-to-use methodologies to assess and analyze people's perceptions on EO and sexual harassment policies. CATSYS is a computer-assisted, command-level version of the NEOSH Survey. It offers Navy commanders accurate and timely data to determine how individuals feel about issues related to EO and sexual harassment. CATSYS provides Commanding Officers with quick feedback from service members on a variety of EO issues.

CATSYS is a menu-driven, PC-based, computer survey system. The survey contains 43 items (5 demographic, 5 SH, and 33 EO questions) and takes about 10-15 minutes to complete. CATSYS addresses the following eight EO content areas:

- | | |
|--|--|
| <input type="checkbox"/> Advancement. | <input type="checkbox"/> Grievances. |
| <input type="checkbox"/> Retention. | <input type="checkbox"/> Sexual Harassment. |
| <input type="checkbox"/> Discipline. | <input type="checkbox"/> Fraternalization. |
| <input type="checkbox"/> Discrimination. | <input type="checkbox"/> Navy Rights and Responsibilities. |

CATSYS helps commands comply with OPNAV instructions, which require that regular EO assessments be conducted. Before the development of CATSYS, individual commands did not have a standardized, command-based, or command-specific measuring tool to determine the effectiveness of its EO efforts. CATSYS is being implemented by the Chief of Naval Education and Training (CNET).

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