FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3
PROGRAM ELEMENT: 0603707N
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0542 Air Human Factors Engineering (HFE)	8,897	8,845	9,375	10,016	10,233	10,402	10,432	CONT.	CONT.
R1770 Manpower and Personnel Development	3,459	4,187	4,280	4,394	4,119	4,097	4,022	CONT.	CONT.
R1772 Education and Training Development	11,612	13,055	13,333	13,684	11,560	11,271	10,869	CONT.	CONT.
R2379 Center for Integrated Manufacturing Studies	969	1,989	0	0	0	0	0	0	4,899
R2496 Advanced Distributed Learning (ADL) Systems	4,359	9,945	0	0	0	0	0	0	14,304
R2715 Distributed Simulation Warfighting Concepts	0	5,967	0	0	0	0	0	0	5,967
R2716 T-STAR	0	1,491	0	0	0	0	0	0	1,491
TOTAL	29,296	45,479	26,988	28,094	25,912	25,770	25,323	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element (PE) supports: a) the Integrated Warfare Architecture (IWAR) Support Areas for Manpower & Personnel, Training, and Readiness; b) the IWAR Mission Areas; c) the Future

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Joint Warfighting Capabilities identified by the Joint Chiefs of Staff; and d) the Future Naval Capabilities (FNCs) for Decision Support Systems, Capable Manpower, Total Ownership Cost Reduction, and Warfighter Protection. It develops technologies that enable the Navy to recruit, select, classify, assign and manage its people; to train effectively and affordably in classroom settings, in simulated environments and while deployed; and to operate and maintain complex weapon systems. It consists of the following technologies:

(U) HFE: This project develop information management techniques, advanced interface technologies, and Decision Support Systems, all of which help ensure that complex systems will be operated and maintained more effectively, with fewer human-induced errors, and with greater safety. The project also, commencing in FY01, develops products to reduce the morbidity and mortality of combat trauma.

(U) Manpower and Personnel: This project provides Navy personnel system managers with the ability to attract and retain the right people and to place them in jobs that best use their skills, training, and experience. Fleet readiness can be enhanced and personnel costs reduced via such technologies as modeling and simulation, mathematical optimization, advanced testing, statistical forecasting, information visualization, data warehousing, data cleansing, web-based knowledge management, and human performance measurement.

(U) Training Systems: This project improves mission effectiveness and safety by applying both simulation and instructional technology to the design of affordable education and training methods and systems. The project develops and evaluates systems to improve basic through advanced individual and team training, skill maintenance, and mission rehearsal capability. It improves training efficiency and cost-effectiveness by applying operations research, modeling and simulation, and instructional, cognitive, and computer sciences to the logistics, development, delivery, evaluation, and execution of training.

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(U) The Navy S&T program includes projects that focus on or have attributes that enhance the affordability of warfighting systems.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the Advanced Technology Development Budget Activity because it encompasses design, development, simulation, or experimental testing of prototype hardware and software to validate technological feasibility and concept of operations and reduce technological risk prior to initiation of a new acquisition program or transition to an ongoing acquisition program.

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PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

B. (U) PROGRAM CHANGE FOR TOTAL PE:

	FY 1999	FY 2000	FY 2001
FY 2000 President's Budget	26,466	20,632	21,196
Appropriated Value	-	40,132	-
Adjustments from FY 2000 PRESBUDG			
Comparability Adjustments from PE 0603706N	+5,200	+5,600	-
Program Adjustment from PE 0603706N	-	-	+5,000
Congressional Plus-ups	-	+19,500	-
Congressional Rescissions	-	-253	-
SBIR/STTR Transfer	-197	-	-
Execution Adjustments	-2,053	-	-
Program Adjustments	-	-	+1,006
Various Rate Adjustments	-120	-	-214
FY 2001 President's Budget Submission	29,296	45,479	26,988

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603707N
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0542 Air Human Factors Engineering (HFE)	8,897	8,845	9,375	10,016	10,233	10,402	10,432	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The goal of this project is to improve platform, task force and battle group operations by developing human factors technology for incorporation into operational systems and training programs. It supports the Future Naval Capabilities (FNCs) for Decision Support Systems and Capable Manpower through enhancing human performance and decision-making effectiveness, reducing design-induced critical human performance errors, and accelerating insertion of advanced HFE technology into existing and new weapons systems. Outcomes from this technology reduce operational errors, provide a better match between personnel and skill/knowledge requirements, and reduce training requirements. The project emphasizes human-centered design and has tasks that address: integration and display of operator-oriented navigation/targeting information; adaptive automation in support of human operators; three dimensional (3D) visualization of command and control information; modeling and simulation tools for design and evaluation of ship manning; human computer interface requirements in workstation design; collaborative support technologies for distributed planning and analysis; advanced sonar operator perception techniques; command and control warfare analysis aids, advanced data fusion and presentation techniques; decision support for joint and coalition Command, Control, Communication, Computers & Intelligence systems; multi-modal sonar workstation design; advanced alerting techniques; and intelligent integration of doctrine and display technology. The Project also supports the FNC for Warfighter Protection, commencing in FY01, by funding advanced technology development for the treatment of casualties of combat trauma. This thrust of the project includes developing: life sustainment and casualty stabilization interventions, preventions for the complications of hemorrhagic shock by early immune modulator or other interventions, improved local hemostatic devices, and improved freeze-dried blood components.

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3

l, and PROJECT TITLE: Air Human Factors
Training Advanced Technology Engineering
Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1999 ACCOMPLISHMENTS:

- Initiated:
  - (U) Adaptive Automation (AA) - Developed a decision support system (DSS) incorporating adaptive automation that provides a dynamic function allocation of operational tasks. The adaptive automation will recognize high operator/pilot workload conditions and transfer normal monitoring and adjustment tasks, as well as other, more routine, human-initiated tasks, to automation. The AA will also recognize high Operating Tempo and potentially stressful situations to dynamically re-allocate appropriate operational tasks. Accomplishments include: (1) identification of the most appropriate target platform(s) and operators to demonstrate these advanced automation decision support tools and techniques, (2) identification of appropriate mission scenarios and Measures of Effectiveness, and (3) preliminary selection of those adaptive automation technologies that seem best suited to the operator/pilot environment.
  - (U) Decision Support System for Coalition Operations (DSSCO) – Developed a DSS that assists U.S. military personnel in developing operational decisions in a cross-cultural coalition military environment. The DSS will aid U.S. decision makers in collaborative planning, situation assessment, response management, and plan revision across culturally diverse military and civilian organizations as well as in coalition operations and operations other than war. The first year addressed the taxonomy and identification of relevant parameters for developing and maintaining situation awareness in a multi-cultural context as well as compilation of past coalition operations and lessons learned associated with planning, re-planning, and executing operations other than war.
  - (U) Virtual Information Center Technologies for Open-Source Requirements (VICTOR) - Developed and applies human-centric decision support technology to Commander in Chief (CINC) level "what if?" analysis in support of

course of action selection. VICTOR will target the existing Open Source information c
in U.S. Commander in Chief, Pacific's (USCINCPAC's) Virtual Information Center (VIC). The project focuses on the process of knowledge management, extraction and presentation from open source data and development of
s models to support C4I decisions that involve diverse, rapidly changing, unclassified data that is collected from political, military, civilian and coalition sources. VICTOR FY99 products include
concept of operations for future Open Source requirements, and a user assessment of an initial advanced human computer interface (HCI) prototype.
(U) Advanced Sonar Workstation (SWKS)-
technologies of: (1) multiple flat panel visual displays and helmet mounted display technology, (2) three-
-modal control and input methods including touch (augmented with a
hetic speech production, 4) information management user support including modality change, attention alerting mechanisms. Limited first year funding provided support for
-21 (Undersea Warfare) working groups and review of rel
documentation.
(U) Display and User Enhancement Technologies (DUETS) - -effective, user sensitive, and mission
-on 3D display for use with Command, Control, Communication, Computers & Intelligence (C4I operational systems. This project will (1) review the critical human performance (e.g., perceptual, cognitive, and motor response) issues related to specific 3D display and object manipulation techniques, (2) identify a C4I system suitable for 3D capabi
space environment and maintain the common tactical picture, (4) add a system independent 3D display to an operational C4I system, and design and develop 3D object manipulation a
related to increased understanding of the battle space environment, and (5) demonstrate and evaluate 3D object manipulation and display concepts. Tasks (1) and (2) have been completed.
- (U) Advanced Alerting (ADALT) - Established requirements, design and prototype an attention allocation subsystem
-alert model used with contemporary naval command

and weapon control systems. Revised requirements definition to directly support DD 21, completed literature review, and developed integrated 6.2/6.3 technical approach.

- Continued:
  (U) The Combat Enhancement through Integrated Decision Support (CEIDS) project was refocused from its original objective of developing
  the Multi- -21 Manning Affordability project in FY99. Significant
  oncepts developed as part of Tactical
  Decision Making Under Stress (TADMUS) with the concept of operations being developed by the manning

  Action Officer and air warfare functions of the MMWS. Further, a working version of the TADMUS Decision support
  - Maritime (GCCS M) as a proof of concept.
  At the request of Commander, Third Fleet (CO -term decision

  -
  and identified those events where human factor considerations are critical. In FY99, categorized the high

  tools and applications; and assessed existing MST tools and applications for applicability in evaluating

  Completed:
  - (U) In Open Systems Advanced Workstation project, conducted final performance demonstrations of the workstation
  Transitioned the multi-
  SC-

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BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603707N PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development PROJECT NUMBER: R0542 PROJECT TITLE: Air Human Factors Engineering

(U) FY 2000 PLAN:

- Continue:
  - (U) In AA, complete knowledge engineering of operator/pilot tasks. Identification of avionics architecture and software support systems insertion points.
  - (U) In ADALT, identify and map both visual and auditory alerting modalities onto ongoing tactical console operator task activities.
  - (U) In DUETS, design and implement the prototype 3D displays, procure 3D hardware. Complete 3D software tools. Design user interface. Perform software modifications to identified C4I system. Draft mission scenarios based on identified C4I track database. Validate scenarios with subject matter experts. Implement 3D user interface for finalized scenarios.
  - (U) In DSSCO, conduct evaluations in military exercises to assess decision requirements for operations other than war (OOTW) planning with coalition military forces and civilian organizations in demanding, uncertain situations. Define, and partially implement, the prototype design requirements for DSS for coordinated OOTW operations.
  - (U) In SWKS, develop quantitative procedures for laboratory evaluations of proposed Integrated Undersea Warfare-21 display formats will be developed and initial testing started. Special attention will be given to quantifying risks and gains associated with multi-modal display support for data fusion and multi-source information integration. Work will begin on development of appropriate laboratory demonstrations of interface concepts.
  - (U) In MST, develop plan for integrating, modifying, and augmenting identified available models and tools. Modify and augment existing tools and techniques to facilitate integration. Develop strategy to fill the gaps. Define a plan to validate the tool set. Validate and modify tool set.
  - (U) Develop VICTOR open-source data collection and presentation guidelines and conduct a cognitive task analysis of VIC analyst functions. Expand VICTOR technology to include data collection and presentation capabilities

for Coalition Planning in support of the Operational Planning Team (OPT) and Crisis Action Team (CAT). Expand VICTOR technology to address HCI issues with respect to multi level security in an effort to provide a fused classified and unclassified picture. Introduce VICTOR technologies into other CINCs beginning with investigation of applications at US Atlantic Command (ACOM).

- Complete:
  - (U) In CEIDS, complete development and testing of AEGIS application of TADMUS Decision Support Software. Complete experiments of revised TADMUS software integrated with the Multi-Modal Workstation for DD-21. Transition experimental results to reduced manning initiatives and Decision Centered Design program.

(U) FY 2001 PLAN:

- Initiate:
  - (U) Intelligent Doctrine (ID) project -- develops an improved doctrine system that will intelligently assist tactical console operators in doctrine development, evaluation, modification, visualization, and use. It will provide a means to write doctrine statements using natural language terms and 3D-object manipulation. Evaluation of doctrine will be assisted by graphically displaying the implications of each doctrine statement using 3D graphics and track symbology. Graphics associated with related systems will be integrated with doctrine visualization.

- Continue:
  - (U) In ADALT, demonstrate the speed and accuracy of alert acknowledgment for six alert presentation methods under two workload conditions using experienced combat information center watchstanders. Correlated visual and auditory displays will be demonstrated and evaluated.

- (U) In SWKS, proposed displays will be demonstrated and evaluated in an operational environment using the DD-21 Advanced Multi-Modal Watch-Station prototype.
- (U) In DUETS, develop and evaluate DUETS 3D display system prototype. Specify human computer interface for 3D display navigation and object manipulation. Develop and validate mission scenarios based on C4I track database. Modify prototype based on initial evaluations. Implement and assess final DUETS display system in an operational environment.
- (U) In DSSCO, develop and field-test the DSS for OOTW planning. Test DSS for coordinated military other than war operations with coalition forces and civilian organizations in demanding, uncertain situations.
- (U) In AA, develop prototype and design simulator tests of adaptive automation DSS for operational tasks. Compare and validate simulator against current operational environment of pilot/operator workstations.
- (U) Develop a prototype of the VICTOR methodology for use in exercise experiments, and develop metrics for the Continue to expand VICTOR technology to address HCI issues with respect to Multi Level Security in an effort evaluation of technology products and guideline/specifications for the application of these technologies. to provide a fused classified and unclassified picture. Introduce VICTOR technologies into other CINCs beginning with investigation of applications at Special Operations Command (SOCOM).

• Complete:
- (U) In MST, demonstrate tool set in operational environment, such as the DD 21 program. Transition set of validated modeling and simulation tools to DD 21/SC 21 design assessment group to support the application of HFE in early stages of ship development.
- (U) Warfighter Protection Reprogramming from PE 0603706N Project R0095.
- (U) Treatment of Casualties to Prevent Hemorrhagic Shock and Complications Associated with Combat Trauma: Further validate the feasibility and efficacy of life sustainment and casualty stabilization interventions. Continue testing modalities that impact metabolic down-regulation and delayed resuscitation. Maintain studies into the complications of hemorrhagic shock and late sequelae that may be prevented with early immune modulator

or other interventions. Extend studies in large animal models. Refine a system to produce sterile water for injection from potable water.

- (U) Blood And Blood Substitutes: Continue development of freeze-dried red blood cell units having a minimum of a two-year room temperature shelf-life and ease of use with immediate transfusion post-rehydration. Further develop freeze-dried plasma and vitrification of platelets. Complete the development of improved frozen and freeze dried platelet products with enhanced storage capabilities.

B. (U) PROGRAM CHANGE SUMMARY: See Total Program Summary for Total Program Element.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.
(U) RELATED RDT&E: This project adheres to Tri-Service Reliance Agreements on Human Systems Technology. Work is related to and fully coordinated with efforts in:
(U) PE 0601152N In-House Laboratory Independent Research
(U) PE 0601153N Defense Research Sciences
(U) PE 0602233N Human Systems Technology
(U) PE 0603792N Advanced Technology Transition
(U) PE 0604703N Personnel, Training, Simulation, and Human Factors
(U) PE 0603007A Manpower, Personnel and Training Advanced Technology
(U) PE 0603227F Personnel, Training, and Simulation Technology

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3
PROGRAM ELEMENT: 0603707N
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1770 Manpower and Personnel Development	3,459	4,187	4,280	4,394	4,119	4,097	4,022	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the Integrated Warfare Architecture (IWAR) Support Area for Manpower & Personnel, and the Future Naval Capabilities for Capable Manpower and Total Ownership Cost Reduction. It responds to requirements for technologies that will maintain or improve fleet readiness while optimizing personnel end strength, and enable the Navy to manage the force through recruiting, selecting, classifying, and assigning people to highly demanding jobs effectively and efficiently. The major goals are to ensure that the Navy has a force that is flexible, integrated, responsive, and affordable so that skilled personnel are available to handle complex weapons systems when needed; and that smaller forces will have greater capabilities by placing the right person in the right job at the right time. The program supports the delivery of new technologies in modeling and simulation, mathematical optimization, advanced testing, statistical forecasting, information visualization, data warehousing, data cleansing, web-based knowledge management, and human performance measurement.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603707N PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development PROJECT NUMBER: R1770 PROJECT TITLE: Manpower and Personnel Development

(U) FY 1999 ACCOMPLISHMENTS:

- Initiated:
  - Initiated Comprehensive Officer Force Management Environment (COFME) effort. This effort builds upon the 6.2 research, Visual Information Filtering for Force Management (VISINFO) project to design a comprehensive Officer modeling environment that includes readiness assessment. The research focuses on the development of an intelligent data-mining approach that will uncover emerging trends and identify data problems. In FY99, a survey of relevant research was conducted, data requirements were identified, baseline Measures of Effectiveness (MOEs) and historical data were collected. Work began identifying, classifying, and quantifying data errors in the Officer Master File.

- Continued:
  - (U) The Enlisted Strategic Planning and Assessment (ESPA) effort developed dynamic methods to model and forecast monthly personnel transactions with four interacting variables in an unstable environment. Developed an intelligent automated user override processing approach to minimize the potential for human error. The Navy Enlisted Force Analysis Model (NEFAM) prototype, a multidimensional long-term forecasting model, was introduced to the user community and subsequently modified in accordance with user community recommendations. A forecasting accuracy tool that the enlisted strength planners can use as a confidence tool for SPAN (an extensive suite of models for enlisted strength planning) forecasts was initiated.
  - (U) The Distribution 2000 Prototyping / Assignment Policy Management System (D2K) effort developed a new concept to integrate the allocation, Navy Manning Plan, and requisition processes as a single process; developed an integrated mathematical model to formulate this new integrated distribution process. The prototype model and system have proved that it is feasible to replace the current lengthy sequential distribution decision processes by a simultaneous decision process. This prototype also includes an experiment of accessing the

model through the Internet. Managers from BUPERS and the fleet can enter the policy inputs, execute the model, and review requisitions through the web.

- Completed:
  - (U) Completed development of the Selection and Classification Management effort. Developed two innovative classification models. Captured the vocational interest framework of Navy jobs as a foundation for developing a Navy vocational interest inventory with sufficient detail and structure necessary for optimal classification decisions. Developed predictive model of school success using new criteria (First Pass Pipeline Success) which goes beyond the traditional definition of a successful student as one who passes A-school; instead looks at optimal performance throughout the training pipeline, including costly academic setbacks and recycling.
  - (U) Completed Modeling and Information Advances for Enlisted Management (MIADEM) effort that provides improved school and sea/shore planning capabilities, resulting in higher productivity and more effective personnel policy decisions. Incorporated school and sea/shore optimization into the web-based prototype variable dimensional community management tool.
  - (U) Completed the Computing and Communications technology for Recruiting (REMOTE) effort for the Boston and the San Diego area Navy Recruiters. Most notably, recruiters are now able to work anywhere, anytime using the computer and communications tools provided as part of the REMOTE project. The final results, costs, and benefits will be evaluated and Navy wide implementation recommendations will be completed in the first quarter, FY00.
  - (U) Completed Training and Transfer Costs for Navy Personnel Models effort using computer simulation to tie together current systems, and track the status of each person and each billet over the duration of the planning horizon. The model projects personnel flows for training and transfer and their associated costs, providing tools needed to make accurate estimates of permanent change of station/Temporary Duty Under Instructions costs for assessment planning.

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BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603707N PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development PROJECT NUMBER: R1770 PROJECT TITLE: Manpower and Personnel Development

(U) FY 2000 PLAN:

- Initiate:
  - (U) Manpower Implications of Advertising to Target Markets (TAMI) effort seeks to determine how advertising affects the propensity to enlist in the Navy. In FY00, an advertising literature review will be conducted, current methodologies, metrics and approaches will be explored, and alternative metrics will be developed.
  - (U) Enlisted Manpower and Personnel Integrated Planning System (EMPIPS) effort will begin developing sophisticated techniques to dynamically identify the data elements and conditions which are likely to have a significant impact on the health (quantity and quality) of the enlisted force. In FY00, user requirements will be identified. A preliminary design concept will be developed. Development of an Integrated Data Environment will be initiated. A proof of concept cost dimension of SKIPPER III (third generation of a system Skilled Personnel Projection for Enlisted Retention) will be initiated.
  - (U) Rating Identification Engine (RIDE) is a classification subproject enabled by the development of a multi-dimensional classification model, which focuses on combating attrition through maximizing training pipeline success, minimizing personnel resource wastage, and emphasizing job satisfaction. Laboratory development of an evolutionary model using a modular combination of ability and interest specifications to improve the Sailor to Rating match; model specifically constructed to reduce attrition, minimize training wastage and improve job satisfaction. Utilizes an innovative success criteria (First Pass Pipeline Success) which goes beyond the traditional definition of a successful student as one who passes A-school; instead looks at optimal performance throughout the training pipeline, including costly academic setbacks and recycling. In FY00 efforts towards model development (research, analysis, design, prototype algorithms, laboratory test, evaluation and assessment) and process redesign (problem diagnosis, end-state vision) will begin.
  - (U) Skill Assessment, Training, Evaluation, and Assistance for Recruiters (STEAR) subproject builds upon the 6.2 New Personnel Assessment Technology project and the 6.3 Computer Communications Technologies for Recruiters projects. This new effort will identify characteristics of successful recruiters and assess what their

training needs are. The characteristics and needs will be used to evaluate both primary and refresher training for recruiters. Similarly, the project will elucidate current selection processes for Navy recruiters and measure personality characteristics of incoming recruiters and compare these results to successful recruiters and current training curricula. Combining these sources of information, the project will specify how training can be improved and how training may be tailored to the personality characteristics of candidate recruiters. In FY00, the current recruiter selection process and evaluation and goaling system will be documented. Recruiters will be surveyed on job skills/activities, training efficacy, job satisfaction, and quality of life issues. A recruiter database will be developed from the Enlisted Master File to include recruiter surveys, training results, productivity measures, and turnover rates. Likely selection measures will be identified and located, pilot tested and modified. Recruiters will be observed on-the-job to determine what training would help them become productive sooner, do their jobs better, and perhaps improve their quality of life.

- (U) Training Continuum and Readiness Modeling (TCARM) will focus on developing and assessing a simulation and optimization model of the training continuum's requirements and resourcing. A requirements analysis and conceptual design will be done in FY00 as will data collection and performance measurement development.

- Continue:
  - (U) Continue COFME effort. Historical data for an Officer econometric retention / accession model will be collected, data cleansing techniques and facilities will be developed, and force monitoring techniques will be specified.

- Complete:
  - (U) Complete ESPA effort. A prototype long-range multidimensional policy assessment system (NEFAM) will be completed, enabling significant gains associated with forecast error. Manpower requirements will be compared with personnel forecasts by paygrade and produce an assessment of the shortages and surpluses in both manpower

readiness and dollar terms. The system will be tested and evaluated. A forecasting accuracy tool will be incorporated into SPAN forecasts.
- (U) Complete D2K effort. An integrated conceptual model will be recommended, to seamlessly link the allocation, manning, requisition, and assignment distribution process. The advantages, disadvantages and risks of the alternative approaches presented will be evaluated.

(U) FY 2001 PLAN:

- Initiate:
  - (U) Initiate Prototype for Assessing Total Force Manpower Management System (TFMMS) Change Requests effort. This effort's objective is to explore the feasibility of using artificial intelligence: Expert Systems, Fuzzy Logic, and Neural Networks to develop a prototype system to improve the TFMMS manpower change process. The inability of TFMMS to capture the critical Navy manpower business practices with respect to sea-shore rotation, Defense Officer Personnel Management Act, validity of application of military essentiality codes, Navy Enlisted Classification requirements, and others results in inaccurate demand signals to the fleet that must be corrected. The preliminary prototype system will be designed based on the preliminary knowledge developed during this first year.
  - (U) Initiate Shore-based Forces Attrition Model. The objective of this effort is to demonstrate new technologies applicable to estimating the quantity and quality of personnel replacements and fillers needed to support contingency and war plans. These new technologies will be synthesized into a demonstration system that will assist Operation Plan, mobilization and personnel planners to better manage Active and Reserve Component personnel for use as attrition replacements.
  - (U) Initiate Simulation Modeling Tool for Manpower Requirements (SimBas) effort. Development of a prototype simulation model that will capture the relationship between Navy force structure (e.g., ships, aircraft) and supporting infrastructure. Such a model would be expected to provide manpower, financial and facility planners

with a tool to assess the impact of changes in force structure size, configuration and operating tempo on the size of the Navy's infrastructure. The first year's effort will focus on detailing the functional requirements, data needs and developing the model design.

- Continue:
  - (U) Continue COFME effort. An Officer econometric retention / accession model will be developed, quality of life data will be collected, force monitoring techniques will be developed.
  - (U) TAMI effort will initiate a decision support system that will facilitate advertising resource allocation and provide measures of effectiveness for alternative advertising strategies. Alternative metrics and models and methodologies will be developed and based upon earlier stages of TAMI, improvements on metrics, models and methodologies currently being used to determine effective marketing strategies to target groups will be proposed.
  - (U) EMPIPS effort will research software modeling and simulation, methods of model and data integration, component based development, internet / intranet implementation, data quality management and cleansing, intelligent software agents, data mining and warehousing, and forecasting methodologies. In FY01, the Integrated Data Environment will be completed. The cost dimension prototype for SKIPPER III will be generalized and the generalize prototype completed. Development of an EMPIPS Accession Planning System prototype and Skill-All Navy (ALNAV) System will be initiated. Work will continue on developing the integrated model prototype.
  - (U) RIDE effort will provide laboratory development of RIDE classification system software including interface optimization, prototyping and demonstration. Focuses on the delivery of the model as being as important as the validity of the model; classification as part of the recruiting sales process requires a credible, configurable, user-friendly delivery.
  - (U) STEAR effort will begin to evaluate the training curriculum for recruiters, to insure that the coursework is providing the proper skills and experiences to prepare recruiters for their work. Successful and unsuccessful

recruiters will be identified. New selection measures will be administered to determine what differentiates the successful and unsuccessful recruiters. Recruiters will be surveyed on job satisfaction, what they like and do not like, what is difficult and easy. Recruiters will be surveyed about what was good, beneficial, unnecessary, and/or missing in their training. Results of this survey will be related to the current curriculum.

- (U) As part of the development of simulation models for Navy-wide impact, the TCARM effort will design a simulation model to analyze the Training Planning and Execution process and collect data to run the simulation.

B. (U) PROGRAM CHANGE SUMMARY: See Total Program Summary for Total Program Element.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: This project adheres to Tri-Service Reliance Agreements on Human Systems Technology. Work is related to and fully coordinated with efforts in:

(U) PE 0601152N In-House Laboratory Independent Research
(U) PE 0601153N Defense Research Sciences
(U) PE 0602233N Human Systems Technology
(U) PE 0603007A Manpower, Personnel and Training Advanced Technology
(U) PE 0603227F Personnel, Training, and Simulation Technology

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603707N
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1999 ACTUAL	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1772 Education and Training Development	11,612	13,055	13,333	13,684	11,560	11,271	10,869	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the Integrated Warfare Architecture (IWAR) Support Area for Training, as well as most IWAR Mission Areas and Joint Chiefs of Staff Future Joint Warfighting Capabilities, all of which depend on high quality training to ensure mission success. It also supports the Future Naval Capabilities for Capable Manpower by responding to requirements for effective and affordable education, training and mission rehearsal capability through applying advanced simulation technology and innovative instructional concepts to the design of individual and team training methods and systems. It applies operations research, modeling / simulation, and instructional, cognitive, and computer sciences to improve: (a) training through-put, efficiency and affordability necessary for "right-sizing" both the operational forces and the training infrastructure; (b) the effectiveness of training for increasingly complex weapons systems employed in littoral warfare, under fast-paced and stressful conditions, and with limited opportunities for "real-world" practice; and (c) training assessment and training system feedback capabilities for maximizing training responsiveness to operational requirements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3
PROGRAM ELEMENT: 0603707N
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development
PROJECT NUMBER: R1772
PROJECT TITLE: Education and Training Development

(U) FY 1999 ACCOMPLISHMENTS:

- Initiated:
  - (U) Development of Conning Officer Virtual Environment (COVE) modular training technologies for teaching ship handling knowledge and skills for various classes of ships. The technology demonstrator will deliver initial, intermediate, advanced, and remedial, “seaman’s eye,” ship handling instruction and practice which alternatively tests and remediates until mastery is complete for a wide variety of ship handling tasks.
  - (U) Development of Intelligent Exercise Planning and Control Agents (IEPCA), a system that supports planning and real-time control and modification of training-objectives-based scenarios in large-scale modeling and simulation training environments.
  - (U) Development of Computer Simulation Based Training System with Intelligent Tutoring Components (CSITS). This project uses cost-efficiently authored interactive simulations and tutoring systems teaching trouble-shooting to improve the instructional effectiveness of fundamental technical training in electronics. Completed curriculum design and selection of instructional strategies, developed two curriculum modules, and conducted initial evaluation of usability.

- Continued:
  - (U) Conducted Deployable Sonar Operator Trainer (DSOT) development and evaluation, including on-board data hcollection. For evaluation purposes, prototype systems were built for test and evaluation aboard ship. Scenario-based performance exercises were constructed to include opportunities for users to develop search plans and propose tactics to deal with particular sonar or environmental circumstances. Evaluation methods for user planning and tactical knowledge were developed.
  - (U) Demonstrated authoring tool for the creation of multimedia training materials and lessons in the area of tactical decision-making (TDM) in the AEGIS environment, and a delivery tool for the actual presentation and management of instruction.

- (U) Continued development of required technology components and demonstrated Transportable Strike/Assault Rehearsal System (TSTARS) for precision strike using validated training mission rehearsal requirements, simulation components and supporting databases. Advanced the state-of-the-art in real-time physics-based sensor modeling and simulation.

- Completed:
  - (U) Interactive Multisensor Analysis Trainer (IMAT) development and evaluation in shore school based Undersea Warfare training and at-sea anti-submarine warfare (ASW) exercises.
  - (U) Implemented Training Effectiveness Assessment Methodologies (TEAM) automated performance recording and assessment of individual and team skills in order to greatly improve deployable tactical training and readiness.

(U) FY 2000 PLAN:

- Initiate:
  - (U) Initiate the development of Synthetic Cognition for Operations Team Training (SCOTT) performance models of simulated teammates and a training research testbed to investigate instructional strategies for training an individual within a simulated environment.

- Continue:
  - (U) Continue DSOT development and evaluation Phase II.
  - (U) Design and develop initial software components for the COVE intelligent tutoring system, instructor/operator system, and marine simulation. Conduct task analysis for shiphandling tasks.

- (U) Continue the development of an authoring tool for the creation of multimedia training materials and lessons in the area of tactical decision making (TDM) in the AEGIS environment, and a delivery tool for the actual presentation and management of instruction. Conduct a training effectiveness evaluation.
- (U) Continue CSITS development completing two-thirds of planned curriculum, and conduct classroom experiments to determine time requirements and instructional effectiveness of the completed curriculum modules.
- (U) Continue IEPCA development, focusing primarily on designing and developing common data structures to enable distributed databases to act in a collaborative manner.

- Complete:
  - (U) Implement TSTARS for precision strike using validated training mission rehearsal requirements, physics based sensor models for Forward Looking Infrared Radar and night vision goggles, correlated sensor displays, and supporting data bases.

(U) FY 2001 PLAN:

- Initiate:
  - (U) Initiate the development of Computer-based Automated Training Effectiveness Evaluation System (CATEES). This effort will develop and demonstrate a computer-based training support toolkit, and a data warehouse and management system. The toolkit will contain a mode for assessing skill proficiency based on job sample testing, and a mode for supporting the development of training scenarios and measuring performance. The data warehouse and management system will be a repository for training performance data storage, and will contain the necessary capabilities for normative databasing, trend analysis, “what if” simulations, and estimating readiness.

- Continue:

- (U) Continue DSOT development and evaluation Phase III, including A-RCI (Advanced Reconfigurable COTS Insertion upgrade for submarine combat systems) interface and further at-sea test and evaluation.
- (U) Integrate, test and evaluate the COVE modular training system. Incorporate required enhancements, and conduct a training effectiveness evaluation in a classroom and at sea.
- (U) Integrate SCOTT performance models of simulated teammates into the training research testbed and experimentally determine the effectiveness and additional perceptual requirements for individual training within a simulated team environment.

• Complete:
- (U) Implement an authoring tool for the creation of multimedia training materials and lessons in the area of TDM in the AEGIS environment to enable faster and better tactical decisions.
- Complete planned development and evaluation of the CSITS electronics-training curriculum. Evaluate cost-effectiveness of experimental authoring tools used in curriculum development. Demonstrate potential for internet delivery of distance instruction.

B. (U) PROGRAM CHANGE SUMMARY: See Total Program Summary for Total Program Element.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: This project adheres to Tri-Service Reliance Agreements on Human Systems Technology. Work is related to and fully coordinated with efforts in:
(U) PE 0601152N In-House Laboratory Independent Research
(U) PE 0601153N Defense Research Sciences
(U) PE 0602233N Human Systems Technology

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2000

BUDGET ACTIVITY: 3
PROGRAM ELEMENT: 0603707N
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development
PROJECT NUMBER: R1772
PROJECT TITLE: Education and Training Development

(U) PE 0604703N Personnel, Training, Simulation, and Human Factors
(U) PE 0603007A Manpower, Personnel, and Training Advanced Technology
(U) PE 0603227F Personnel, Training, and Simulation Technology

D. (U) SCHEDULE PROFILE: Not applicable.