

NAVAL AIR WARFARE CENTER TRAINING SYSTEMS DIVISION ORLANDO FLORIDA



Products and Services Handbook



2011-2012



CONTENTS





COMMAND INFORMATION

| | |
|--------------------------------|---|
| INTRODUCTION | 5 |
| MISSION STATEMENT | 5 |
| OVERVIEW | 6 |
| THE NAWCTSD ORGANIZATION | 7 |

CAPABILITIES

| | |
|---------------------------------|----|
| ACQUISITION | 9 |
| ACQUISITION SUPPORT GROUP | 9 |
| FRONT-END ANALYSIS | 10 |
| IN-SERVICE SUPPORT | 10 |
| LOGISTICS | 11 |
| RESEARCH AND DEVELOPMENT | 11 |
| SYSTEMS ENGINEERING | 12 |
| MODELING AND SIMULATION | 13 |
| TEST AND EVALUATION | 13 |
| PROJECT MANAGEMENT | 13 |

| | |
|---------------------------------|----|
| COOPERATIVE RELATIONSHIPS | 15 |
|---------------------------------|----|

| | |
|---------------------|----|
| PRODUCT LINES | 17 |
|---------------------|----|

| | |
|----------------------------|----|
| PROGRAM DIRECTORATES | 19 |
|----------------------------|----|

| | |
|-------------------------------|----|
| RESEARCH AND TECHNOLOGY | 47 |
|-------------------------------|----|

DOING BUSINESS WITH NAWCTSD

| | |
|-------------------|----|
| CUSTOMERS | 53 |
| CONTRACTORS | 55 |

| | |
|-------------------------------|----|
| EMPLOYMENT WITH NAWCTSD | 59 |
|-------------------------------|----|

| | |
|-----------------------|----|
| PHONE DIRECTORY | 61 |
|-----------------------|----|

| | |
|---------------|----|
| I/ITSEC | 63 |
|---------------|----|



NAWCTSD





INTRODUCTION

This Naval Air Warfare Center Training Systems Division (NAWCTSD) Products and Services Handbook is intended to provide you with an overview of the organization, its capabilities, and a few examples of our products.

At NAWCTSD, we have an exceptionally skilled military and civilian acquisition, research and development workforce, that along with our advanced laboratories comprise a center of excellence that produces leading-edge advances in training systems and human performance.

NAWCTSD employs more than 1,000 personnel at our location in Orlando's Central Florida Research Park and at more than 30 field sites supporting the fleet.

Our site in Central Florida gives us the advantage of co-location with other military acquisition, research and development organizations, the University of Central Florida, and close proximity to the center of the simulation-based entertainment industry.

The demands evolving from changes to modern combat, new roles for military operations, and use of high technology weapons systems place increased emphasis on effective and efficient training solutions. It is through the application of technical, business, and leadership expertise that enables NAWCTSD to be continually responsive to emergent military needs by providing systems that enable both readiness and proficiency. We welcome the opportunity to partner with other military organizations, private industry, and academia in meeting the training needs of our nation's Warfighters.

NAWCTSD MISSION

To be the principal Navy center for research, development, test and evaluation, acquisition, and product support of training systems, to provide Interservice coordination and training systems support for the Army and Air Force, and to perform such other functions and tasks as directed by higher authority.

NAWCTSD OVERVIEW

ROLE

Within the Naval Air Systems Command, NAWCTSD is the Navy's source for a full range of innovative products and services that provide complete training solutions. This includes requirements analysis, design, development and full life cycle support. NAWCTSD provides continuous learning across a wide variety of applications including aviation, surface, and undersea. NAWCTSD integrates the science of learning with performance-based training focused on improving the performance of Sailors and Marines. We continually engage the Warfighter to understand challenges, solve problems, create new capabilities, and provide essential support.

HISTORY



The roots of NAWCTSD reach back to April 1941 when then-Commander Luis de Florez became head of the new Special Devices Desk in the Engineering Division of the Navy's Bureau of Aeronautics. De Florez championed the use of "synthetic training devices" and urged the Navy to undertake development of such devices to increase readiness. In June, the office became the Special Devices Section.

Throughout World War II, the Section developed numerous innovative training devices including ones that used motion pictures to train aircraft gunners, a device to train precision bombing, and a terrain modeling kit to facilitate operational planning in the field.

The Special Devices Section grew and became the Special Devices Division. In August 1946, the Division, at its newest home at Port Washington, Long Island, N.Y., was commissioned the Special Devices Center.

THE EVOLUTION

As NAWCTSD evolved and grew, it was aligned at various times under several different parent organizations within the Navy. In 1956, it became the Naval Training Device Center. Over a three-year period in the mid-1960s, the Center moved from its Long Island location to Orlando, Florida. In 1985, the then-Naval Training Equipment Center became the Naval Training Systems Center. The Center moved to its present headquarters building in Orlando, named for its founding father Luis de Florez, in 1988. On October 1, 1993, the Naval Training Systems Center became NAWCTSD, a significant component of the Naval Air Systems Command (NAVAIR). As an echelon 4 command, NAWCTSD reports directly to the Commander, Naval Air Warfare Center Aircraft Division (NAWCAD) headquartered at Patuxent River, Maryland.

THE FUTURE

The roles of the Department of Defense, the Navy, and NAVAIR are changing. Simulation and training will be key to ensuring military preparedness and to adapting to new and changing roles and missions. These changes, coupled with



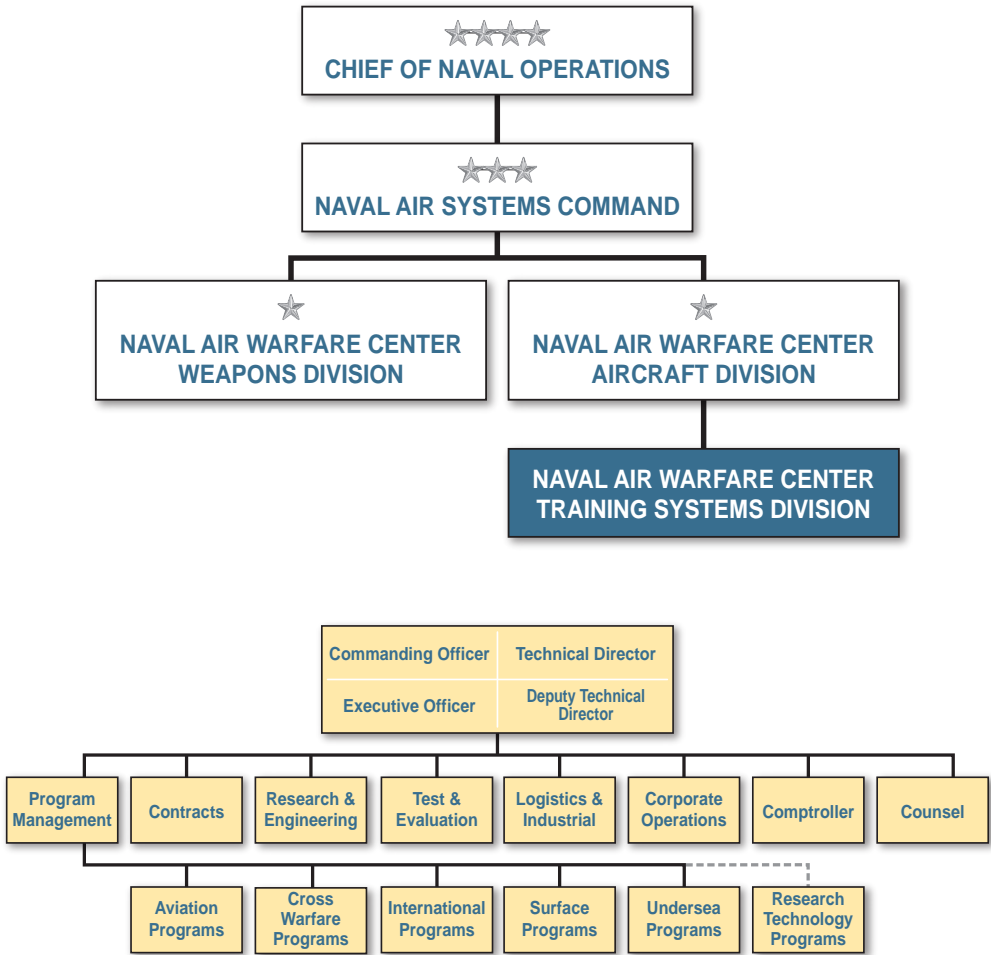
diverse threat potentials in the post-Cold War world, will require innovative approaches to how our military trains.

NAWCTSD will continue to play a vital role in responding to evolving training and simulation needs. NAWCTSD will also continue to work to transfer its products to non-military applications through cooperative agreements.

The command has implemented competency alignment and is now a more efficient organization, allowing the command to continue its high-quality support of customers. Hand-in-hand with competency alignment, adherence to total quality concepts and best practices will allow NAWCTSD to continue to improve its products and services.

NAWCTSD will play a vital role in maintaining the defense posture of this nation and our allies around the world. Training systems and plans must be developed simultaneously with emerging weapon systems to be prepared for the full spectrum of military operations. The training systems must also be effective and efficient. To these ends NAWCTSD is dedicated.

THE NAWCTSD ORGANIZATION



CAPABILITIES





ACQUISITION

NAWCTSD's acquisition process can be identified by three primary phases; these are:

1. Requirements Analysis
2. Acquisition
3. Support

These processes are described in detail in our internet-based Acquisition Guide, which provides a "one stop" information center on the integrated overall acquisition process at NAWCTSD. The Acquisition Guide provides a macro-to-micro look at these processes. It is accessible to both government and industry personnel as a dual (government/industry) use program.

The Acquisition Guide can be found at:
<http://nawctsd.navair.navy.mil/Resources/Library/Acqguide/Acqguide.htm>

ACQUISITION GUIDE
NAVAL AIR WARFARE CENTER
TRAINING SYSTEMS DIVISION - ORLANDO FLORIDA

This view into our processes covers the entire analysis/acquisition/support process from determination of a training need through life cycle support of a fielded system. The wide dissemination of NAWCTSD processes has three major purposes. The first is to educate our own employees. The second is to inform other government agencies and customers about how NAWCTSD operates. And the third is to inform industry. Anyone using the Acquisition Guide can leverage information provided to further refine their own processes. Access to detailed government processes allows industry, our customers, and NAWCTSD to better position themselves as true partners in an Integrated Product Team (IPT) arrangement.

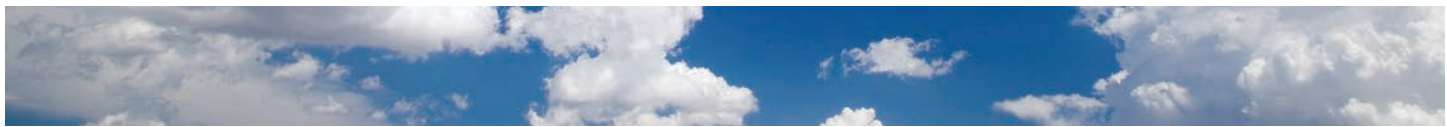
The acquisition process at NAWCTSD begins with the receipt of a requirement. The requirement can come from many sources. These include: Initial Capabilities Document, Capability Development document, Capability Production Document, Navy Training Plan, existing curriculum, and many others. That requirement is then categorized as a particular type of work such as new training system procurement, device modification, services, life cycle support, or front end analysis. We then conduct market research, further document the requirement based on the market research, make a commerciality determination, and then propose the acquisition strategy to procure the requirement. Depending on the scope of the program, the following steps will then occur:

- ◆ Develop an acquisition package to include the Request For Proposals (RFP)
- ◆ Evaluate proposals
- ◆ Award Contract
- ◆ Conduct Design reviews
- ◆ Conduct Acceptance Testing
- ◆ Establish Ready for Training and Initial Operational Capability
- ◆ Conduct interim and long term life cycle support

In 2011, NAWCTSD created the Acquisition Support Group (ASG) as a result of a continuous process improvement initiative. The ASG is a cross-competency enterprise team empowered to provide communication, facilitation, horizontal integration, collaboration, accountability, and process transparency to the acquisition process.

The ASG goal is to achieve process transparency across NAWCTSD at a level that provides enough insight of all work being performed by Integrated Product Teams

ACQUISITION SUPPORT GROUP (ASG)



(IPTs) and associated competency personnel to facilitate continuous process improvement. The objectives of this group include providing detailed status of Work in Process (WIP), improving acquisition knowledge, and increasing internal and external stakeholder satisfaction. The ASG is chartered to maintain key performance metrics which will assist Leadership with facilitating workload acceptance decisions. The Charter also includes responsibility for evaluation of changing processes and policies and communicating cross competency impacts.

The intent is to provide assistance to IPTs without being intrusive. The group's focus is on metrics, communication, and providing TSD-focused acquisition information on the cross-competency impacts of changes in the organization's policies, instructions or guidance.

FRONT-END ANALYSIS

Front-end analysis (FEA) is a structured process we use to examine training requirements and identify alternative approaches to training job tasks. Using the process, we identify job tasks to be performed, analyze the skills and knowledge needed to perform them, assess the technologies available for training the skills and knowledge, perform a media analysis to recommend the best mix of delivery media, and provide cost and lead-time comparisons for the feasible alternatives.

The purpose of the analysis is to provide the customer with sufficient information to meet training needs within budgetary and other constraints. The analysis offers a recommendation, but also includes a number of options, each with a different training potential and cost estimate. This allows the program sponsor to make sound training decisions based on relevant and thoroughly analyzed data.

Early planning permits us to provide a full range of options, to include embedded training, and to consider the impact operational equipment designs will have on training. Therefore, it is important to consider training needs early in the design of any new weapon system. The FEA documentation forms the basis for the life cycle investment strategy and subsequent system evaluation.

The FEA process can be applied not only to new systems, but also to existing systems which are being upgraded and modified. In fact, whenever there is a training challenge, a change in mission/doctrine, a change to the weapon system, a need to integrate newer technology into the classroom, or to move training from the classroom, an FEA should be conducted to determine whether, and the extent to which, the training needs to be modified.

Training options can vary widely, from computer based training, to Electronic Performance Support Systems (EPSS), to complex, high-fidelity simulators, to traditional stand-up lectures, and classroom aids. The FEA documentation provides the justification supporting the development/procurement of the selected training solution.

IN-SERVICE ENGINEERING SUPPORT

The NAWCTSD In-Service Engineering Offices (ISEOs) provide localized, cost-effective Fleet support of fielded training devices. ISEO personnel assist in keeping training systems current, making fidelity improvements, and implementing the training system life cycle management support plan. They are the front line representatives and conduct valuable liaison work between the Fleet/customers and NAWCTSD.

In-service engineers provide on-site technical and engineering support from concept formulation, to installation, to end of life disposal. They are active members of the Integrated Project Teams/Externally Directed Teams (IPTs/EDTs) as well as



NAVAIR's primary agents for accomplishing on-site trainer modifications and life-cycle support. Services include:

- ◆ Trainer Acquisition Support
- ◆ Engineering Change Support
- ◆ General Engineering Support
- ◆ Configuration Management (CM)
- ◆ Fleet Synthetic Training (FST) Support
- ◆ Information Assurance (IA) Support

There are currently 44 ISEOs/~100 ISEs located throughout the United States and Japan.

LOGISTICS

Logistics is the practical business of taking care of details for life-cycle support of training systems – planning for transportation, installation, maintenance, spare parts, and repair.

NAWCTSD learned that planning for logistical support must be done early, before the training system is built. To reach the goal of ensuring that the training system is available for training at least 95 percent of the time, reliability and maintainability must be designed and built into the training system. Therefore, logisticians form an integral part of the team that develops the specifications for the RFP package. For this purpose, logistics engineers develop Integrated Logistic Support requirements embodying these details.

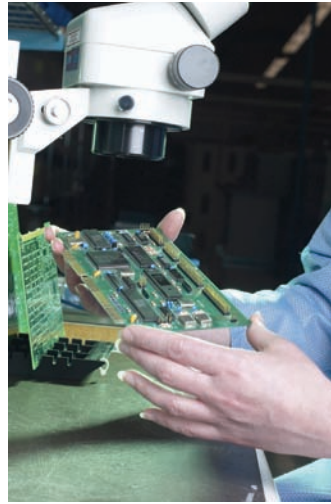
Logistics specialists contribute to the initial procurement planning package, each concentrating on a particular area of expertise. A critical area is publications – wiring and schematic diagrams, computer software and maintenance manuals, and other support documentation. Another area is providing spare parts for the life of the training system. How many and what kind of parts are needed and where are they to be stored? Also where will the device be located, and what facilities and support personnel are there? Is there a facility to house the device, with or without modifications, or will one have to be built? These and a myriad of other considerations are a part of the logistics advance planning requirements.

Once the training system is built, logisticians form part of the in-plant and on-site test team. They examine each element of the design which relates to logistics to ensure specifications have been met.

RESEARCH AND DEVELOPMENT

NAWCTSD's research mission is to plan and perform a full range of directed Research and Development (R&D) in support of Naval training systems for all warfare areas and platforms, to maintain an expanding technology base, and to transition research results to the Fleet. The R&D program emphasis is on Fleet and training command requirements, rapid transition of products, industry/academia coordination, coordination with other services, and improved quality and cost effectiveness of products. Needs for Naval service training systems are generated by new weapon system requirements, by modifications to existing weapon systems, and by Fleet requirements for new training systems and





capabilities to satisfy specific training tasks. Thus, the R&D program is balanced among improvements in highly specialized areas of simulation, training methods, training technologies, and providing direct technical support to the training systems acquisition effort to reduce risk and cost.

The majority of the work undertaken constitutes the Technology Base Program and includes exploratory development, where innovative technologies and methodologies are developed, and advanced development, where proof-of-concept is established. Additional efforts include cooperative/collaborative research with other government agencies, non-profit institutions, and commercial firms. Research funds are received from NAVAIR, Naval Air Warfare

Center, the Office of Secretary of Defense, Department of Homeland Security, Office of Naval Research, Joint Forces Command, Defense Equal Opportunity Management Institute among many others.

NAWCTSD has a long history of technology transfer to both the public and private sectors. NAWCTSD is involved with the local public school systems, non-profit groups, local, state, and federal organizations, and industry in partnerships to share information and expertise. By sharing Navy training research and development, the public benefits in having improved education and training. The Navy also receives valuable information in the exchange of resources.

SYSTEMS ENGINEERING

Engineers are assigned to specific warfare areas – aviation, surface, undersea, or land – where they develop special experience and expertise. Based on their backgrounds, engineers are selected to provide the engineering expertise required to develop and procure specific training systems.

Their first role is to write engineering specifications for the training system based on analysis of the Training System Functional Descriptions (TSFD) – normally supplied by the Human Performance Analysis and Instructional Systems Division – and other known requirements. The information the engineer receives indicates what the training system is to teach and what features and characteristics it is to have. The engineer develops a set of engineering specifications and procurement documents that will enable a contractor to understand what is required in the design and production of the specified trainer and to submit a responsive technical proposal.

Later, the engineer plays a principal role in evaluating the proposals received from offerers. This evaluation allows selection of the contractor (to perform the contract) that offers the best value. During the development and construction of the training system, the engineer maintains close contact with the contractor to review designs, evaluate progress, and resolve technical and program problems as they arise. The engineer reviews progress and technical reports from the contractor, participates in design review meetings, and visits the contractor's plant periodically for on-site evaluation.

The project manager leads the in-plant acceptance test team when the contractor has produced the trainer. Technical leadership is provided by the project engineer. The team tests the training system to ensure that it complies with equipment specifications and that it will serve the training need for which it was designed. Similar on-site testing is conducted when the training system is installed in the field to ensure that it functions properly in its training location.



MODELING AND SIMULATION

The Advanced Simulation, Visual and Software Systems Division, serves as NAWCTSD's central point of expertise relative to Navy and DOD Modeling and Simulation (M&S) initiatives. The division provides technical authority and innovative solutions in a number of key areas including aero/vehicle dynamic modeling verification and validation, visual/sensor simulation, software engineering, software acquisition management, interoperability, distributed simulation, distance learning technologies and M&S in general. Since the 1990's, the division has had a long history of first-hand experience with DOD interoperability standards and provides both engineering expertise and products to a wide range of customers across all Naval warfare areas. Examples include work with Distributed Interactive Simulation (DIS) and High Level Architecture (HLA). Recent key advances include low-cost Personal Computer (PC)-based simulations using MicroSim technologies and virtual communications technologies including live-to-virtual communication interfaces and bridging technologies between DIS/HLA and telephone standards. Our primary goal is to ensure that our customers and program sponsors are provided with systems that not only meet customer requirements, but also do so efficiently, and in a manner that conforms to the most recent open system architectures and standards. Our knowledge and experience gained through exposure to a multitude of military platforms provides us with a unique opportunity to leverage across the various warfare areas as well as other non-military applications and Federal agencies.



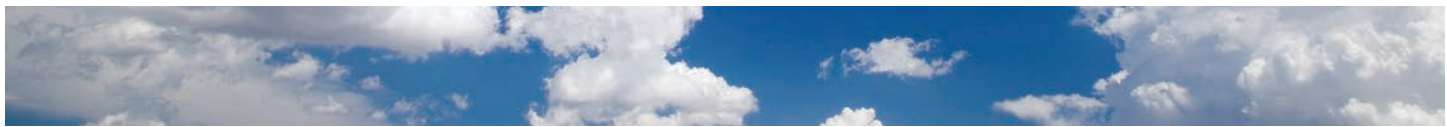
TEST AND EVALUATION

Test and Evaluation (T&E) is an essential component of the acquisition process. NAWCTSD has made an important change by integrating an organic Test and Evaluation competency into the organization. This change will increase the fidelity and the rigor placed in the test and evaluation of training systems. The transition and integration will take place in phases over the coming years.

It begins with a review of T&E processes, policy, and organization in order to benchmark training system testing, identify potential improvements, and assess NAVAIR T&E integration into training system IPTs. This effort will initially support projects within Naval aviation, and it will be followed by Navy-wide projects and, finally, all NAWCTSD projects. This integration will improve program performance in providing quality training systems for the Warfighter.

PROJECT MANAGEMENT

Within the Program Management Competency, NAWCTSD has fully accountable Program Directors (PDs) whose role is to provide focus and advocacy for specific customer and supplier relationships. The PD's responsibility is to provide leadership, direction, priorities, and support to the planning, management, execution, and control of assigned training systems. They champion NAWCTSD's mission and capabilities with the full range of sponsors, customers, and suppliers, and they continually measure, evaluate, and improve the efficiency and effectiveness of the program management processes. The PDs perform their responsibilities primarily through their leadership of Project Managers (PJM) who report directly to them.



COOPERATIVE RELATIONSHIPS



PARTNERSHIPS

NAWCTSD enters into partnerships which offer significant benefits, such as lower costs, collaborative efforts, and development of commercial sources. Lower costs are achieved through cost sharing, expert collaboration, and leveraging of resources including facilities and equipment. Working together allows “re-use” versus “re-development” and joint versus independent development. Development of commercial sources allows transition of Federally-developed technology and uses the strength of the free enterprise system. By pursuing shared objectives, the partners are able to work as a team. For more information contact our Partnership and Technology Transfer Office at ORLO_Orlando_Tech_Transfer@navy.mil or (407) 380-4699. Partnership mechanisms which we utilize include:

- ◆ Cooperative Research and Development Agreement
- ◆ Memorandum of Understanding
- ◆ Memorandum of Agreement
- ◆ Inter-service Support Agreement
- ◆ Interagency Agreement
- ◆ Education Partnership Agreement
- ◆ Commercial Service Agreement
- ◆ Licensing Agreement

TEAM ORLANDO

Team Orlando is a partnership among the military services, industry, and academia working to leverage resources and contribute to the overall security of the United States.



Naval Air Warfare Center
Training Systems Division



Program Executive Office
Simulation, Training and
Instrumentation



Marine Corps
Systems Command
Program Manager
for Training Systems



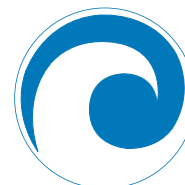
Air Force Agency
for Modeling
and Simulation



Joint Training
Integration and
Evaluation
Center




Joint Forces
Command
Orlando



National Center
for Simulation



University of
Central Florida
Institute for
Simulation
& Training



PRODUCT LINES





NAWCTSD's capabilities are delivered across four primary product lines. These products lines are: training systems, training services, training content, and intellectual services.

TRAINING SYSTEMS

Our training systems product line includes the hardware, software, and associated physical infrastructure that comprise both new systems and modification of existing training systems. New training systems include development or production where the system is the contractual delivery or the system is being developed with in-house personnel. Training systems modified include trainer modification where the system modification is the contractual delivery or ISEO personnel are performing a minor modification. Examples include computer rehost and minor modifications.

TRAINING SERVICES

Training Services consists of Training Courses, Site Surveys and Fielded Systems Support under Contractor Operation and Maintenance of Simulators (COMS) contracts, either through Centrally Managed or Simulator Operation and Maintenance (SOM) funded efforts.

TRAINING CONTENT

Our training content product line includes both content delivered or modified – curriculum development or modification where the curriculum package is the contractual delivery.

INTELLECTUAL SERVICES

Analysis, Studies and Experimentation – A sample listing of Analyses or Studies consist of Front End Analysis, Training System Requirements Analysis, Training Situation Analysis, Technical and Operational Analysis, Mission Support Analysis, Verification and Validation Analysis, Modeling and Simulation, Mission Capabilities Study/Analysis, Patents, Publications, Specifications, and Prototypes, Small Business Innovation Research (SBIR) transitions, research transitions to acquisition projects, CRADAs, partnerships, and interagency agreements.

PROGRAM DIRECTORATES



AVIATION

The Program Director for Aviation (PDA) is aligned to both NAWCTSD and the Naval Air Systems Command Training Systems Program Manager (PMA205) for management of Naval and Marine Corps aviation training programs, systems, and products relating to aviation weapons systems, platforms, and environment. The scope includes aircraft, armament, air traffic control, aviation systems, and other related equipment. PDA provides support for aviation related training provided by the Naval Education and Training Command (NETC) and its subordinate commands.

PROGRAMS IN THE AVIATION DIRECTORATE

F/A-18, EA-18 TACTICAL OPERATION FLIGHT TRAINER (TOFT)



The F/A-18C/D Hornet, F/A-18E/F Super Hornet and EA-18G Growler TOFT provides a realistic, networked, scalable, full-spectrum combat training environment for pilots and Naval Flight Officers. The TOFT environment provides a distributed simulation mission space that allows aircrew to receive, process, and transmit commands and information. TOFT devices consist of integrated workstations and elements that simulate the actual aircraft avionics, weapon systems, friendly and opposing forces, as well as command and control components. TOFT systems are divided into four distinct development segments. They are (1) Simulated Cockpit, (2) Mission Management System (MMS), (3) Interoperability/Naval Aviation Simulator Master Plan (NASMP) Compliance, and (4) Visual System. The TOFT is a PC-based architecture,

maximizing off-the-shelf cost effectiveness and reuse. The PC-based TOFT, along with its modular software architecture, facilitates technology insertion and simulator/aircraft concurrency.

AIRFIELD TOWER OPERATOR TRAINING SYSTEM



The Device 15G32 Tower Operator Training System (TOTS) provides training for Navy and Marine Corps Air Traffic Control (ATC) trainees in a full-immersion, high fidelity, simulated control tower environment. The 15G32 provides a safe, controlled environment for concentrated, hands-on ATC training without requirement for actual aircraft, aircrew, or flight support equipment. The 15G32 possesses the capability to simulate a wide variety of emergency conditions and malfunctions as required by the training scenario to accommodate the level and complexity of the training being conducted.

P-3 WEAPON SYSTEM TRAINER

This training device has been developed to train a full aircrew in all the missions of the P-3. The device can



be coupled with the P-3 Operational Flight Trainer (Device 2F87(F)) to afford the pilots more realistic training. Certain crew qualifications can be achieved in this device.

MV-22 FULL FLIGHT SIMULATOR



The MV-22 Full Flight Simulator (FFS) replicates the MV-22B aircraft performance during cockpit preflight, aircraft start-up, full-flight operation in both conversion and fixed wing modes, navigational flight, instrument flight, aircraft shutdown, and cockpit post-flight procedures.

The FFS is network capable for training all Marine Corps MV-22 pilots and copilots for all aspects of flight to include tactics, instruments, Night Vision Goggles (NVG), procedural, etc. The FFS is mounted on a six-degree-of-freedom motion base with a secondary motion system to simulate the rotor vibrations felt by the aircrews.

MH-53E OPERATIONAL FLIGHT TRAINER (OFT)



The MH-53E OFT simulates, in real time, applicable normal and emergency aircraft operations with respect to both transient and steady-state flight, engine performance, flying qualities, aircraft system operations, radio navigation and communication systems operation, environmental effects, ground operations, and other flight parameters.

T-44A/C AIRCRAFT TRAINER SIMULATOR



The T-44 simulators, Devices 2F129A and 2F129C, are used to train Navy, Marine, Air Force, Coast Guard, and foreign military pilots in the operation, procedures, and flight of the T-44A and T-44C twin-engine propeller aircraft. Each trainer includes a cockpit with seating, instruments, and controls for the pilot and a copilot, an Instructor's Operator Station (IOS), a digital electronic control loader system, an aural cueing system, a hydraulic motion base, and aircrew performance analysis hardware and software. Two of the five trainers have been modified to replicate the avionics upgrade of the T-44C aircraft. The current avionics upgrade effort includes the replacement of the existing aural cueing, audio communication/intercom systems and



specified avionics to match the T-44A aircraft's avionics upgrade. Also included in upgrade projects is refurbishment of all remaining avionics and the cockpit necessitated by the integration of the avionics upgrade; modification of the debriefing system software to capture student performance with the new configuration, and revision software graphics to properly depict specified glass-cockpit instrumentation.

LANDING SIGNAL OFFICER TRAINER



The mission of the Landing Signal Officer Trainer (LSOT) is to provide realistic simulation of shipboard fixed-wing aircraft recovery operations under various standard operational conditions and under shipboard and aircraft emergency conditions. The trainer closely replicates Fleet equipment, displays, and controls. The LSOT consists of an IOS position, a simulated LSO platform, and a 270 degree visual display.

EA-6B OPERATIONAL FLIGHT/ NAVIGATIONAL TRAINER

The Operational Flight/Navigational Trainer (Device 2F143) simulates the front cockpit and performance of the EA-6B Improved Capability (ICAP) II Block 89A production aircraft. It provides training in pilot and Electronic Countermeasures Officer (ECMO)/co-pilot ground, airborne, normal and emergency procedures, carrier and field takeoff/landing, in-flight control and navigation skills and techniques to enable efficient and effective operation and management of EA-6B aircraft systems.

The device consists of a high fidelity replica of the front cockpit of the EA-6B (trainee station), an out-of-the-cockpit visual system, a motion system, an IOS



and a computer complex with peripheral equipment and power distribution system. Device simulation provides: duplication and activation of the flight controls, aerodynamic performance, instruments, communication and other operational equipment of the EA-6B cockpit. The simulation enables aircrew members to become proficient with cockpit controls in order to perform the full range of flight functions, respond to emergencies, and perform aircraft ground procedures. Aircrew activation of the controls results in instrument responses/displays that duplicate the EA-6B aircraft throughout its entire operating envelope.

H-60 TRAINERS





H-60 Maintenance and Weapons Load Trainers, provide instruction and practical experience in the maintenance, troubleshooting, inspection, and adjustment of aircraft systems in addition to the loading and unloading of weapons associated with the armed helicopter and Organic Airborne Mine Counter Measures (OAMCM) equipment.

– Fuels, 11H98 – Armament, 11H99 – Flight Controls and 11H100 – Landing Gear. The one software-based Instructor-led training device is the Instructional Graphics Training Device (IGTD).

AIRCRAFT FUEL CELL TRAINER



The Aircraft Fuel Cell Trainer, Device 2H154, is a multi-faceted Fleet training aid that will be utilized to provide realistic initial fuel cell entry and maintenance training to maintenance personnel.

The purpose of the trainer is to provide Enlisted Navy and Marine Corps maintainers with hands-on experience in performing fuel cell entry preparations, fuel cell entry procedures, fuel cell inspection procedures, component removal and installation procedures while demonstrating a thorough knowledge of all safety precautions.

The trainer contains two mobile, self-contained, freestanding generic fuel cells with an aircraft-shaped fuselage exterior. All components in the trainer are based on real aircraft parts. The trainer gives maintainers the opportunity to practice organizational maintenance procedures and troubleshooting skills on an aircraft fuel cell. The main focus of the trainer is the simulated fuel cells with removable access panels, permitting students access to the fuel cells to inspect internal components. Three students are permitted on top of the trainer and three student observers or instructors are permitted on each wing.

AV-8B TRAINERS



The AV-8B Training Systems Aircrew simulator inventory includes five Weapons System Trainers. These five devices are non-motion based and provide training in the skills and techniques involved in (1) Vertical/Short Takeoff or Landing (V/STOL), (2) basic aircraft control, (3) instrument flight procedures, (4) utilization of air-to-ground and air-to-air weapons delivery modes of the AN/APG-65 Radar, (5) stimulated Night Vision Goggles (NVGs), (6) Forward Looking Infrared (FLIR), (7) defensive electronic countermeasures, and (8) normal/degraded/emergency mode operations for all AV-8B plus radar night attack aircraft systems under day/dusk/night conditions.

The AV-8B Training systems maintenance trainer inventory includes eight hardware-based devices: 11H93 – Power Plant, 11H94 – Avionics, 11H95 – Electrical, 11H96 – Egress, 11H97



SHIPBOARD AIR TRAFFIC CONTROL TRAINING SYSTEMS



Device 15G30, Advanced Shipboard Air Traffic Control (ATC) Training System (ASATS), consists of the Carrier Air Traffic Control Center (CATCC), and the Amphibious Air Traffic Control Center (AATCC). CATCC provides individual and team training in aircraft carrier ATC operations. AATCC provides individual and team training in amphibious aviation ship ATC operations.

AATCC, formerly known as Helicopter Direction Center (HDC), includes both HDC and Tactical Air Control Squadron (TACRON) capabilities. TACRON control consists of Tactical Air Traffic Control (TATC) and Tactical Air Direction (TAD). The TATC controller is responsible for the airspace. The TAD controller controls all aircraft in the assigned operational area, assigns missions and targets, and monitors Bomb Damage Assessments (BDAs). The TAD also maintains communication with the Forward Air Controller (FAC).

CATCC and AATCC each consist of a host computer system with peripheral equipment, an IOS, and simulated shipboard controller positions surrounded by the auxiliary indicators,

lights, and status boards found in the shipboard operational environments. The computers are connected via a local area network to a speech recognition/response and simulated operational communication network.

KC-130J WEAPON SYSTEMS TRAINER DEVICE 2F199



The KC-130J Weapon Systems Trainer (WST) Device 2F199 simulates the operational and performance characteristics of the KC-130J aircraft in order to facilitate flight training and cockpit familiarization under normal, adverse, and emergency conditions. The WST systems and equipment function interactively to simulate the aural, visual, and motion conditions experienced during actual KC-130J aircraft operations. The WST contains actual, modified, and simulated aircraft equipment, complete with working controls, indicators, panels, and instruments. Aircraft seats and seat tracks are used along with furnishings and general equipment. Cockpit instruments, indicators, panels, consoles, skirts, and controls are configured like the KC-130J. On the WST, the windscreens are simulated to provide an enclosed effect as in the aircraft, but are specifically tailored to suit the needs of the visual system.

MULTI-CREW SIMULATOR PROGRAM (MCS)

The Multi-Crew Simulator Program (MCS) consists of two reconfigurable mission trainers and associated supporting Interactive Courseware (ICW). The MCS Trainer system will



train multi-crew aircraft Student Naval Flight Officers (SNFOs) to acquire advanced military aviation skills in



airways and radar navigation, weapons system operations, sensor utilization and electronic warfare operations, communications effectiveness, situational awareness, and in-flight decision making for E-2, P-3/P-8, EP-3 and E-6 Naval Flight Officer Undergraduate Training. The MCS also supports the introduction of E-2D and P-8 aircraft and the divestiture of T-39 aircraft.

E-2C/C-2A RECONFIGURABLE FLIGHT TRAINING DEVICE (RFTD)



The RFTD was designed to provide enhanced part task training for both CNS/ATM configured E-2C/C-2A and baseline Hawkeye 2000/C-2A cockpits with NP2000 propeller systems. It trains pilots/copilots for normal/emergency procedures, aircrew coordination training, carrier and land based operations and was designed to support transition training to the CNS/ATM advanced technology cockpit. LCD touch screens are used to interface with cockpit components. A visual system and flight control loading system are used to accurately model aircraft characteristics. The RFTD can rapidly

change aircraft configurations without needing re-boot or host system management.

E-2D OPERATIONAL FLIGHT TRAINER (OFT)



The E-2D OFT is part of the Hawkeye Integrated Training System (HITS) that also includes curriculum and a training management system. It trains pilots/copilots for normal/emergency procedures and both carrier and land based operations.

E-2D TACTICS TRAINER (TT)



The Tactics Trainer (TT) Trains Naval Flight Officers in both systems usage and troubleshooting, as well as tactical employment for Command and Control (C2) and Airborne Early Warning (AEW).

E-2D WEAPONS SYSTEM TRAINER (WST)

The OFT and TT can be linked, enabling the two devices to act as one to train the entire crew of five together. When coupled, the devices are referred to as the WST.



SURFACE

The Program Director for Surface and Expeditionary Warfare Programs (PDS) manages training programs, systems, and products to support the training needs for Naval Surface and Expeditionary Warfare weapons, Command and Control, and Hull, Mechanical, and Electrical systems. PDS provides support for surface and expeditionary warfare related training provided by the Naval Education and Training Command (NETC) and its subordinate commands.

PROGRAMS IN THE SURFACE DIRECTORATE



MULTI-PURPOSE SUPPORTING ARMS TRAINER (MSAT)

MSAT provides an immersive large field-of-view partial dome display and After Action Review training environment for individual and team training in the employment of supporting arms and close air support for Joint Terminal Attack Controllers (JTACs), Forward Air Controllers, and Forward Observers. The training environment replicates the operational environment by providing the users with emulated and simulated military equipment (Defense Advanced GPS Receiver (DAGR), Vector-21B, Portable Light-weight Laser Designator Rangefinder (PLDR), IZLID 1000 long-range infrared pointing and illuminating laser, and virtual radio) to detect, identify, locate, and designate targets, and conduct fire missions using both voice-controlled intelligent Semi-Automated Force (SAF) agents for

standard missions and human-in-the-loop role players for advanced talk-on missions. Additionally, MSAT interfaces with STRIKELINK and Video Scout to provide Digital Call For Fire (CFF) Close Air Support (CAS) training capabilities. MSAT has received Joint Close Air Support Executive Steering Committee (ESC) certification to replace 33 percent of the live fire events required for JTAC annual currency.

MULTI-MISSION TACTICAL TRAINER (MMTT)/TACTICAL ACTION OFFICER (TAO) INTELLIGENT TUTORING SYSTEM (ITS)

The MMTT provides tactical sensor and command and control (C2) simulation for use by ship and ship/air combat teams and Strike Group staff supervisory-level personnel. The MMTT system supports a wide range of training operations. It can be run as a



stand-alone multi-ship/multi-aircraft trainer, or can be interfaced to existing training devices to upgrade or enhance current training capabilities.



The trainer is based on the PC-based Open-architecture for Reconfigurable Training Systems (PORTS) architecture which runs the Combined Tactical Training and Analysis System (CTTAS) as its core simulation engine.

The trainer provides the necessary tools to:

- ◆ Train combat team supervisory personnel in the tasks that they must perform during the course of a mission
- ◆ Develop the decision-making and communications skills of ship and ship/air combat teams and Strike Group staff supervisory-level personnel

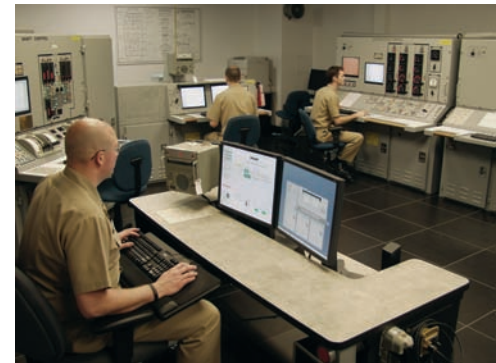
The MMTT is designed to be an easily re-configurable multi-platform trainer, using software modules to simulate generic shipboard and aircraft combat systems and consoles. Wherever practical, operating procedures for trainee stations have been modeled after procedures and formats implemented in the actual equipment that the station is designed to represent.

The TAO Intelligent tutoring System (ITS) is an additional training capability which runs independently of but controls specific PORTS MMTT high-fidelity TAO simulation applications to deliver the desired curriculum principles. One goal of the TAO ITS is to reduce the number of instructors supported in a single classroom.

Another goal of the TAO ITS is to train the student in 'command by

negation' tactical watch control, where watchstanders perform their duties autonomously while the TAO supervises, intervening only to correct mistakes and rectify omissions. The TAO must know which warfare responsibilities belong to each watchstander, how and in which circumstances those duties are performed, and how to communicate with watchstanders to request information, acknowledge reports, and order appropriate actions.

DDG-51 MACHINERY CONTROL SYSTEM (MCS)



The Machinery Control System (MCS) simulator (Device 19G4) provides a realistic training environment for the Arleigh-Burke (DDG-51) guided missile destroyer gas-turbine propulsion plant training.

The MCS simulator provides training for prospective Commanding Officers, Executive Officers, Department Heads, and Engineering Officers of the Watch students. Designed to closely resemble the DDG-51 Central Control Station and the Shaft Control Unit located in the Main Engine Room, its primary purpose is to teach gas turbine principles, watch keeping practices, and the full scale operation of the DDG-51 MCS consoles. The MCS simulator consoles interface with and are controlled by a central Instructor/Operator station.

Although effective for training the baseline DDG-51 class, the ever-changing configurations of the Arleigh-Burke required an adaptable and highly configurable training solution.



Rather than pursue costly and time consuming development of separate hull-specific MCS hardware labs to accommodate, the 19G4 was augmented with a PC based alternative, allowing the Surface Warfare Officers School (SWOS) to keep up with the increasing student throughput and provide instructors greater flexibility in course scheduling.

This system is now supplemented with a PC-based solution running an updated version of the MCS software, implemented as an Automated Electronic Classroom. The DDG-51 Class MCS Desktop Simulator (Device 19G4A) can be utilized either as a stand-alone watch station trainer for individual instruction, a watch-team trainer with two or more consoles being operated in an integrated mode, instructor-led training, or as an integrated extension to the Multi-Mission Team Trainer.

The PC-based nature of this training device also provides flexibility for trainer upgrades to accurately reflect new systems and configurations installed in the fleet. The system currently implemented at SWOS, running on COTS software, can also be easily extended to support training at fleet concentration centers or schoolhouse environments. One of the key features of the 19G4A is the ability to present the various DDG-51 class configurations through a touch-screen interface. This allows for a relatively inexpensive training solution that realistically simulates user interaction with the switches, gauges, and controls on an actual engineering console.

NAVAL SEAMANSHIP & SHIPHANDLING CONNING OFFICER VIRTUAL ENVIRONMENT (NSS COVE)

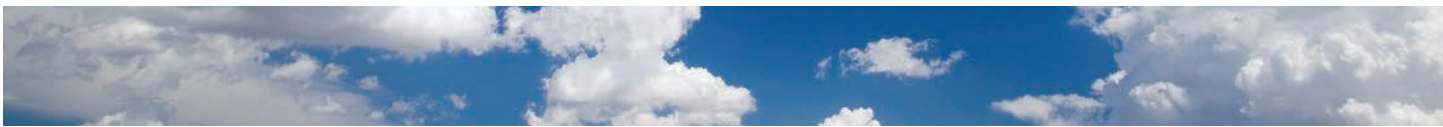
The COVE family of trainers is a system of scalable, reconfigurable PC-based simulators, offering an immersive virtual reality maritime training environment. They provide

the full continuum of navigation, seamanship, shiphandling, piloting, and tactical ATRP (anti-terrorism/force protection) training for Naval personnel.



Originally conceived in 2000 as an Office of Naval Research (ONR) Research and Development (R&D) effort, COVE has evolved into a robust and extensible shiphandling simulator, primarily utilized at the Surface Warfare Officers School (SWOS) in Newport, RI, but also installed in fleet concentration areas. Based on the VirtualShip2000™ COTS software architecture, COVE contains a high degree of additional functionality in order to support NSS training. It features hydrodynamically accurate high-fidelity ship models for all existing U.S. Navy combatants, a selection of U.S. Coast Guard cutters and small boats, and a wide array of foreign military vessels, merchants, fishing boats, and other commercial vessels. The collection of over 70 visual (harbor) databases covers virtually every major U.S. and foreign port that the U.S. Navy regularly visits. These databases are leveraged as a shared resource with the Navy's Virtual Submarine (VESUB) programs, also based on the VirtualShip2000™ architecture.

COVE was first delivered to SWOS in 2003 as a single lab containing six stations for Division Officer training in the basics of seamanship and shiphandling. Later expanded to a second identical lab, these trainers include Head Mounted Displays (HMD's) for a full 360 degree field of view and speech recognition to allow for student interaction with virtual crewmen.



Additionally, six more advanced COVE units are available for training prospective Commanding/Executive Officers. They include integrated radar and Voyage Management System (VMS) displays, and the choice between HMD's or fixed monitors for viewing the virtual environment.

The Tactical COVE (TA-COVE) is a full mock-up of a ship's bridge, surrounded by a 360 degree screen, with twelve projectors providing a high definition visual scene for day or night tactical training. Unlike the other COVE configurations which are designed to train a single officer, this Full Mission Bridge supports watch team training of 6-10 personnel. It includes electronic (virtual view) binoculars for target identification and HMD's to supplement the primary on-screen display allowing the Conning Officer to look down from the bridge wings for docking or pier side maneuvering. TA-COVE teaches core decision-making skills in difficult pre-constructed scenarios. These skills include situational awareness, task prioritization, multi-tasking, weapons engagement, tactical maneuvering, and communication. The system is designed with the fidelity to train watch teams in the dynamic decision making process needed to defend against terrorist vessels and other force protection threats.

The Littoral Combat Ship (LCS) bridge trainer is the most recent configuration built on the COVE baseline. Developed to train the officers manning the Navy's newest surface combatant, it features five large LCD screens that provide a realistic, high-fidelity field of view. Responsive controls and integrated radar, navigation, and engineering status displays provide the watchstanders with the data needed to conduct everyday operations. The architecture of the LCS COVE trainer allows rapid reconfiguration of the ship control console to support high-fidelity training on both LCS-1 and LCS-2 bridge configurations. The reduced manning of an LCS bridge watch team represents a paradigm shift

for the Navy, and the LCS COVE trainer successfully provides the immersive environment needed to train LCS crewmembers to handle this new skill set.

One of the key features of COVE is its ability to easily link different configurations of the simulator together into a single training event. This allows for the simultaneous training of many officers of varying rank and responsibility, utilizing a diversity of ship classes, within a shared virtual environment. This scalable functionality allows for the creation of complex training scenarios, addressing learning objectives that were previously impossible to teach in a classroom.

LITTORAL COMBAT SHIP (LCS) TRAINING SYSTEM EXECUTIVE AGENT (TSEA)

In May of 2010, the NAWCTSD Program Directorate for Surface (PDS) and Expeditionary Warfare Programs was assigned as the Littoral Combat Ship (LCS) Training System Executive Agent (TSEA) for the LCS Program Office (PMS 501) and the LCS Mission Package Program Office (PMS 420).

The LCS is designed to defeat growing littoral threats and provide access and dominance in the coastal water battlespace. A fast, maneuverable, and networked surface combatant, the LCS provides the required warfighting capabilities and operational flexibility to execute focused missions close to the shore such as mine warfare, anti-submarine warfare and surface warfare.

A flexible and reconfigurable seaframe, LCS derives combat capability from rapidly interchangeable mission modules and an open architecture command and control system. Modularity maximizes the flexibility of LCS and enables commanders to meet changing warfare needs, while also supporting spiral development and technology refresh.

The LCS is designed to provide each crew member with the technological ability to perform multiple



functions. With a base crew of 40, LCS will also have 20 crew members in an aviation detachment plus 15 sailors in its selected mission package.

Because of its small crew and high-tech capabilities, LCS sailors will be required to report to their ship ready to stand the watch. The old shipboard training regime was not an option for LCS crews. This is a totally new training paradigm for the surface Navy, and it has to be built correctly from the bottom up. Add to this challenge the requirement to build training for two different variants of seaframe in at least three different warfare missions and one can begin to understand the magnitude of the training challenge.

The LCS Program approach is to implement a training strategy that will support the Train to Qualify (T2Q), Train to Certify (T2C), and “Rapid Refresh” objectives. As the LCS TSEA, PDS coordinates the training efforts of the entire LCS Team. PDS is currently supporting detailed Front End Analysis (FEA) work, and leveraging NAWCTSD’s contracting expertise to ensure the Navy finds the best industry partners

available to build and sustain the LCS training system of the future.

Using a strategy based on “Virtual Ship Operations”, NAWCTSD is coordinating the use of many different kinds of training products to meet the many needs of LCS. These products include technologies such as LCS-1 Virtual Maintenance Performance Aid; Conning Officer Virtual Environment; LCS-1 and LCS-2 Readiness Control Officer Trainer; LCS Tactical Action Officer Trainers, and LCS Mission Package Trainers. PDS is also supporting the identification of facilities for these new LCS trainers—as well as assisting with identifying facility modifications that may be required. Finally, PDS work includes the identification of new training courses and media such as the need for developing a team Mission Bay Trainer (MBT) to ensure the proper training of all LCS Launch, Recovery and Handling System skills. This MBT team trainer will include the use of Tactical Training Equipment as well as the design and construction of both low- and high-fidelity trainers not yet available today.

UNDERSEA

The Program Director for Undersea (PDU) manages training programs, systems, and products relating to undersea weapon systems, platforms and environment, including submarines, submarine systems, integrated undersea surveillance, deep submergence and other related systems; and support for undersea-related training provided by Naval Education and Training Command (NETC) and its subordinate commands.

PROGRAMS IN THE UNDERSEA DIRECTORATE

NAVIGATION TRAINERS

Submarine Piloting and Navigation (SPAN) and Reconfigurable Submarine Piloting and Navigation (RSPAN)

The Submarine Piloting and Navigation (SPAN) trainer provides team and individual training in piloting and navigation principles of a surfaced

submarine. SPAN trainers use a PC-based image generator (IG) to produce a simulated visual scene of a harbor/ waterway as if the submarine were traveling on the surface. The team uses navigation techniques and simulated and tactical equipment to ensure the ship is safely piloted and navigated in various harbors and under variable environmental conditions.



The SPAN trainer provides team or individual training for the Helmsman, Fathometer Operator, Navigation Center Operator (GPS and Inertial Navigation equipment), Voyage Management System (VMS) Operator, Navigation Plotter (paper charts), Contact Coordinator, Fire Control Technician, Periscope Operator, Data Recorder, Electronic Deck Log (EDL) Recorder, BPS-15H Radar Operator, Commercial Radar operator, Officer of the Deck (OOD), and Lookout. The Engineering Officer of the Watch (EOOW) and the Sonar Supervisor are simulated through automatic engine order responses and tracker assignments in the sonar system. SPAN can stimulate commercial and military navigation equipment. Key to training is the ability of SPAN to provide an accurate replay of a training session. Additionally, the instructor can insert equipment faults, change weather, sea state, tide and current environmental factors, create and change surface ship traffic level, and train in over fifteen worldwide ports and open ocean scenarios.



The Reconfigurable Submarine Piloting and Navigation (RSPAN) trainer can be configured to any class of submarine navigation training system

and, if necessary, reconfigured in a matter of minutes. To convert from one configuration to another, the instructor need only select the appropriate stations from the keyboard/video/mouse (KVM) system on the trainer floor, load the appropriate hull configuration at the instructor station, and initiate the training scenario. Like SPAN, the RSPAN provides work stations for all members of the navigation party. RSPAN adds support for VIRGINIA class submarines and advanced systems such as the photonics mast.

Virtual Environment Submarine for Shiphandling (VESUB)



VESUB is a virtual-reality based computer system utilizing Virtual Environment and Head Mounted Display technology. The trainer provides the Officer of the Deck (OOD) trainee individual instruction in the knowledge and skills necessary to successfully and safely pilot and maneuver a surfaced submarine through restricted waterways while avoiding collisions and grounding.



VESUB immerses a student in a virtual waterway scene under varying geographic, environmental, and emergency conditions. The trainee stands in a bridge mock-up, wearing a head-mounted visual display with a 78-degree horizontal Field-Of-View (FOV) and a 40-degree vertical FOV and communicates with other virtual members of the submarine crew. A full 360-degree simulated harbor can be seen by the student by turning the head or body. VESUB allows the OOD to view the selected harbor or restricted waterways and control ship parameters (course, speed, and rudder).

VESUB has Commercial-Off-The-Shelf hardware and software, an Instructor Operator Station, a visual system, trainee station, voice recognition and synthesis system, audio system, screen displays, and a printer.

A key feature of VESUB is its ability to provide an accurate “replay” of a completed training session, recording a student’s actions and allowing all scenario events to be played back in a Debrief mode.

Submarine Skills Network (SubSkillsNet)



SubSkillsNet provides on-board skills training for individuals, sub-teams, and teams using an integrated system of simulations that can be configured to meet a variety of training objectives (e.g., contact coordination, navigation, tactical plotting, navigation plotting, fire control, and sonar operation). These simulations run networked together, or in stand-alone mode, to provide individual

operator or team training capabilities in the schoolhouse environment (training classrooms and labs) as well as on board a submarine.

The instructor workstation allows an instructor to set up, control, and monitor dynamic exercises. The newly designed PerfEval application allows an instructor to monitor important parameters during an exercise, to collect and display student performance data and to support after-exercise critiques.

MULTI-PURPOSE RECONFIGURABLE TRAINING SYSTEM (MRTS) COMMON SUBMARINE RADIO ROOM (CSRR)



The Multi-Purpose Reconfigurable Training System (MRTS) for Common Submarine Radio Room (CSRR) trainer provides an instructor the ability to provide CSRR training in a virtual training environment. MRTS CSRR can be configured to replicate the different tactical increments and versions of the CSRR system for each specific submarine class. The trainer consists of specially developed simulation software running on the backbone of Commercial-Off-The-Shelf (COTS) hardware and software components.

MRTS CSRR is reconfigurable for each class of submarines specific hardware layout using the instructor operating station. The Student Station consists of 18 equipment racks that house the CPUs and touch screen flat panel monitors that replicate the CSRR. The trainer is customizable to allow a



Communication Team to utilize their boat's COMMPLAN, simulating an actual at-sea scenario. At any time, the instructor has the ability to insert a predefined simulated fault into the system to test the communications team or student response. Once a fault is inserted, the students exercise their ability to diagnose and work around the fault.

SUBMARINE COMMUNICATION SUPPORT SYSTEM (SCSS)

The MRTS Submarine Communications Support System (SCSS) trainer provides 688 Class reconfigurable team and individual training in communications similar to that provided by the CSRR implementation.

CSRR MAINTENANCE TRAINER

The MRTS CSRR Maintenance Trainer provides the ability to execute approved troubleshooting procedures to simulated repair, replacement, alignment, and/or adjustment of specified components of the CSRR system as part of an approved troubleshooting procedure. The instructor will inject a fault at the Instructor Operator Station (IOS), which will cause the Operator Trainer to come up in a faulted state. The student will then be directed to perform an operator action. During the operation the student will detect or experience problems. The trainee will then use their designated documentation laptop and technical manuals to troubleshoot the fault down to a specific device. Once the student determines the fault, they will then go to the Maintenance Rack and perform the corrective maintenance on the faulty device.

WEAPONS LAUNCH CONSOLE TEAM TRAINER

The MRTS Weapons Launch Console Team Trainer (WLCTT)

provides team and individual training on firing scenarios for Machinist's Mates (MM) and Fire Control Technicians (FTs). Team training scenarios include Tomahawk Missile Launch for both vertical and horizontal tubes and ADCAP Snapshot for all the supported configurations. The MRTS WLCTT is capable of operating with one instructor and providing for home port refresher and weapons console qualification in a



safe and immersive training environment. The trainer is made up entirely of Commercial-Off-The-Shelf (COTS) hardware and software, including personal computers and thirty-three Liquid Crystal Display (LCD) flat panel touch screen displays. The instructor can manage configurations and scenarios while the students follow procedures, interact with the touch screens, and coordinate with the other stations during the different scenarios of the training session

Team training on the MRTS WLCTT is a potent and cost-effective alternative to shipboard training. It provides for multiple configurations of submarines, virtual launches of cruise missiles and torpedoes. Training on the MRTS WLCTT provides a quick method to start scenarios at critical points within each configuration. It also provides a means to move to these critical points for focused training sessions. Instructors can easily change configurations and



scenarios with just a few button clicks. Some of the MRTS WLCTT's configuration subsystems include the Common Display Console (CDC), Attack Center Console (ACC), Status Firing Panel (SFP), Tube Control Panel (TCP) [MT/TT], (TCP)[MT/TT], Command Launch Console (CLC), Weapons Interface Module (WIM), Weapons Monitoring Panel (WMP), and Weapons Control Console (WCC).

HULL, MECHANICAL, AND ELECTRICAL TRAINERS

Fire Fighting Trainer (FFT)



Fire fighting Training (FFT) for submarine crewmen centers on the trainee's actions while interacting with other members of the damage control team in the extinguishment of a large fire. Examples of large fires include bilge, hull insulation, and oil spray fires. The Submarine FFT is a "live fire" training environment designed to simulate combating submarine fire casualties. The trainer is integrated into a specially designed, compartmentalized building that has a training compartment, an instructor operator station compartment, a burner room, trainee staging areas, and storage for fire fighting equipment.

Students enter the training compartment through a submarine

hatch. The training compartment has three propane-fueled fireplaces: Hull Insulation (Class A), Bilge/Oil Spray (Class B), and Electrical Panel (Class C). The training compartment and fireplaces have mock-ups and obstructions to simulate the onboard submarine space. Students are taught to use submarine fire hoses and extinguishers such as simulated Aqueous Film Forming Foam (AFFF), simulated Purple Potassium Powder (PKP), and CO₂ to fight various types and classes of fires.

The trainer has an environmentally safe, mineral oil-based smoke generation system to provide smoke obscuration during training. Students wear submarine-approved protective clothing and air breathing equipment, such as a Scott Air Pak or an Emergency Air Breathing (EAB) system. The FFT safety system is designed to continuously monitor propane levels and compartment temperatures and will activate trainer shutdown when preset values are exceeded. Emergency-stop switches are located on the Instructor Operator Station (IOS) and inside the training compartment in case of a training timeout or an emergency. During trainer shutdown, high capacity ventilation fans are activated automatically and propane valves are closed to prevent fuel flow. In addition to the submarine hatch entrances, the training compartment has an emergency corridor and two emergency exits for safe evacuation of personnel in the unlikely event a critical incident may occur.

Each trainer is equipped with an IOS, compartment control panel, internal communications, typical shipboard alarms/lights, and other shipboard equipment. Communications between the IOS and training compartment is provided by two-way sound-powered telephones, intercom system, 4MC Damage Control communications system, and two-way handheld radios. From the IOS, instructors use the computer-based operating system to set up fire fighting scenarios for two-day basic, two-day



advanced and one-day team training. The training scenarios include flame growth, flame spread, flame extinguishment, and flame re-flash. Pipeline and submarine crew fire fighting training is conducted on a continual basis throughout the year at the submarine homeports.

Damage Control Team Trainer

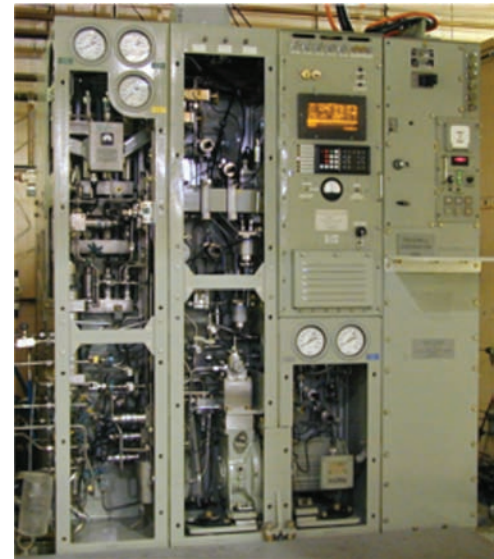


The Submarine Damage Control Team Trainer (DCTT) is a shore-based, dynamic wet training facility used to train and evaluate damage control team performance in the identification, reporting, and repair of flooding casualties resulting from controlled water and air pipe leaks. The simulated environment features a mock-up of a submarine port side engine room, which provides a realistic environment for the training objectives. Air and water pipe leaks are initiated from the instructor console. Crew actions in response to these leaks provide the criteria for evaluation and critique of damage control team performance during realistic casualty situations.

The DCTT is a watertight, concrete, stand-alone structure configured to represent a submarine hull. Catwalks, ladders, pump and equipment mock-ups, Emergency Air Breathing (EAB)

equipment, battle lanterns, communication equipment, loudspeakers, and other equipment complete the illusion of an operating submarine. The DCTT water distribution system includes a 1200 GPM pump that draws water from a 24,000 gallon storage tank. The pump is driven at 1750 RPM and delivers water at a pressure of 80 PSI to the trainer. The DCTT piping/valves are routed through and around the simulated engine room mock-ups. A water treatment system continuously filters, chlorinates, heats, and circulates the trainer water.

Automated Electrolytic Oxygen Generator (AEOG) Trainer



The AEOG trainer provides individual hands-on training for operators and technicians on selected preventative maintenance procedures, fault analysis, and troubleshooting procedures on the model 6L16E. This trainer interfaces with the PC-based instructor station and associated Simulator Input/Output (SIO) equipment which interfaces with controls and indications that look and operate like the tactical AEOG. The training scenarios are designed to duplicate actual operational and maintenance procedures used on board a submarine.

CROSS WARFARE

The Program Director for Cross-Warfare (PDX) manages training programs, systems, services, and products related to individual training, joint services, cross and multiple warfare areas, non-DOD systems and applications, and command-directed areas of interest. Typical projects in this directorate are those supporting Naval education and training claimancy, special operations, Joint Forces Command, the modeling and simulation community and organizations external to the DOD, such as Department of Homeland Security. The directorate is often the incubator for leveraging emerging technologies or non-traditional training methodologies such as leveraging gaming and entertainment industry techniques.

PROGRAMS IN THE CROSS WARFARE DIRECTORATE

BATTLE STATIONS 21



The USS TRAYER, a three-quarter-size replica of a guided missile cruiser, is the central component of Battle Stations 21, commissioned in June of 2007. NAWCTSD served as the acquisition manager for this ground-breaking training system.

Recruits enter the training system's 157,000 square-foot building to find themselves on a "pier", complete with a façade that resembles an actual pier in Norfolk, Virginia. Realism is enhanced with special effects lighting, scents of sea water and diesel fuel, surround audio, and 90,000 gallons of water sloshing between the pier and the "ship". Battle Stations 21 incorporates the latest in virtual reality programs, entertainment technology, and modern design and construction techniques. About 45,000 recruits a year move through 17 different shipboard scenarios that test problem-solving, communications, and other essential skills. The NAWCTSD acquisition team received the Admiral

Luis de Florez Pioneer Award and Honorable Mention in NAVAIR Commander's National Award.

CROSS WARFARE P-3 AIR CREW TACTICAL TEAM TRAINER (PACT3)



The combined effects of reduced operationally-ready aircraft due to P-3 fatigue-related groundings; increasing demands to support non-Anti-Submarine Warfare (ASW) missions, and the inherent complexity of ASW sensor training have resulted in a marked decrease in P-3 aircrew ASW operational proficiency. A Commander, Patrol and Reconnaissance Group (CPRG) analysis has shown a 25% decline in average ASW aircrew ability to successfully complete the ASW kill-chain and a 33% increase in the time to conduct a Critical Contact of Interest (CCOI) ASW prosecution following detachment and/or deployment to remote sites where real-world ASW missions are at a minimum.



In response to this training shortfall, the NAWCTSD, in cooperation with its military and private industry partners, developed the P-3C Aircrew Tactical Team Trainer (PACT3). PACT3 is a low-cost, low-footprint, deployable, high-fidelity training system, and provides ASW aircrew members with the means to maintain highly perishable skills at forward-deployed locations.

PACT3 provides a first-ever PC-based training capability for currently fielded P-3 Maritime Patrol Aircraft that can be reused with very minor flight dynamics model modifications to represent the Navy's future P-8 Maritime Patrol Aircraft. The trainer also allows for cross platform (Aviation, Surface, Sub-Surface) coordinated ASW integrated team training. Five P-3 stations and an instructor station have been developed for the PACT3 system, including: Pilot, Tactical Coordinator (TACCO), and Sensors 1, 2, and 3. The capabilities of these stations include functionality to perform valuable Anti-Submarine Warfare (ASW) training.

The PACT3 provides Science and Technology (S&T) innovation in four principal areas: 1) non-acoustics stimulation, signal processing and display, 2) acoustics processing, 3) training system capacities and 4) system interoperability. Using a Mission Rehearsal Tactical Team Trainer (MRT3) and Effective Active Acoustic Simulation (EFAAS) technology baseline, the PACT3 provides innovative software implementations of active and passive sensing to include: Multi-static processing, Bottom Reverberation, Biologic Clutter, and Surface Scattering models, as well as the RADAR, ESM and MAD non-acoustic sensors for the P-3 ASW tactical nucleus (Pilot, Tactical Coordinator, Sensor 1, Sensor 2, and Sensor 3).

During the development of the PACT3 system, a system that simulates the output of the Air Deployable Active Receiver (ADAR) sonobuoy in an Improved Extended Echo Ranging

(IEER) environment was developed and integrated into the trainer. IEER is a mono/multistatic acoustic sensor system that utilizes an ASW aircraft, supporting acoustic source, and acoustic receiver in a coordinated ASW search and surveillance mission against conventionally powered submarines operating in shallow water environments as well as all submarines operating in deep water. The innovative development of the Improved Extended Echo Ranging (IEER) provides the P-3 aircrew with vastly enhanced ASW training not previously available.

The availability of a deployable, high-fidelity training system that has the capability of being fully integrated with others within the Navy Continuous Training Environment (NCTE) synthetic battle space will make relevant training attainable by P-3 crews while forward deployed.

The PACT3 team worked directly with VP-30, P-3 Weapons and Tactics Unit, PMA-205, and PMA-290 during development to provide the most effective training system possible. The PACT3 Team received the Admiral Luis de Florez Pioneer Award and the NAVAIR Commander's National Award for Science and Technology. The PACT3 system will be deployed to various sites beginning in December 2011 for unit and integrated training.

ANTI-SUBMARINE WARFARE VIRTUAL-AT-SEA TRAINING (ASW VAST) MISSION REHEARSAL TACTICAL TEAM TRAINER (MRT3)

The ASW VAST MRT3 system is a networked, PC-based, deployable trainer designed to support integrated and coordinated ASW tactical training and enhance team decision making. The current training system configuration is comprised of PCs representing a mission training station in a particular aircraft (i.e. SH-60B, SH-60F, P-3C) or ship-board system



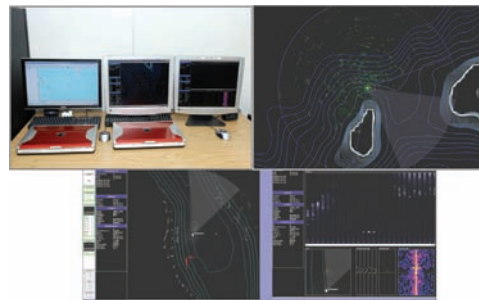
which, when in a networked environment, allow for integrated mission training. Additionally, the Joint Semi-Automated Forces (JSAF) serves as the Instructor Operator Station (IOS), allowing configuration and control of MRT3 components and supporting After Action Review (AAR) requirements.



Whether at homeport or deployed, the ASW VAST MRT3 will allow the entire ASW ship/aircrew team to train together synthetically, thereby augmenting and enhancing flight and steaming hours, and allowing the Warfighter to maintain increased tactical ASW proficiency.

MRT3 systems provide Integrated Training Capability for air assets. MRT3 is a Navy Continuous Training Environment (NCTE) compliant system.

EFFECTIVE ACTIVE ACOUSTIC SIMULATION (EFAAS)



The Effective Active Acoustic Simulation (EFAAS) Trainer is an Office of Naval Research (ONR) project focused on improving active acoustics simulation for training applications in order to improve the Navy's ASW skill set. EFAAS will provide improved simulation and stimulation of the

shipboard active SONAR system representation through the AN/SQQ-89 On-Board Trainer (OBT). This will provide the Fleet the ability to more effectively train in active SONAR without putting energy in the water. EFAAS provides training through stimulation of the Tactical Software for the adjunct Sonar System of the Mid-Frequency Active Sonar system.

The impact of providing EFAAS to the fleet is four-fold: 1) provides the ability to more effectively train active SONAR without putting energy in the water; 2) increases training capability now for active sonar training in-port; 3) reduction of active sonar training hours at Sea by increasing operator awareness of operational active system capabilities and limitations; and 4) provides world-wide training capability using range dependent ocean models. The EFAAS system provides Integrated Training Capability for surface assets. EFAAS is a Navy Continuous Training Environment (NCTE) compliant system.

The EFAAS Team received the 2008 NAWCAD Commander's Award. The EFAAS system was transitioned into the Fleet at multiple sites and ships. This includes deliveries to Japan, San Diego, California, Pearl Harbor, Hawaii, and Everett, Washington. These EFAAS systems are being evaluated by Fleet users and are being used to participate in Fleet Synthetic Training (FST) events.

VIRTUAL ASTAC (VASTAC)

The VASTAC provides ASTAC tactical air control training in the helo control mode. The VASTAC exchanges information with the virtual helicopter (MRT3) via a synthetic Hawklink. Shared information includes C2 (Reference Mark, FTP, tracks, buoy loadout, buoy deployment), Voice via Voice over IP (VoIP), and Sensor information (Acoustic, MAD, ESM, RADAR). All operator controls emulate AEGIS Baselines 5.3 through 7.1. VASTAC provides the ASTAC operator with



realistic simulation for coordinated tactical training.

HOMEPORT TRAINING (HPT)

Geographically Distributed Training (GDT) began in 1999 and approximately one year later took on the name of Homeport Training (HPT). It was initiated to replace organic Navy courses with contracted turn-key training from colleges and other vendors at Fleet Concentration Areas (FCAs) to reduce sailor deployed time, reduce cost, and maximize college credits and certificates for training received.

HPT provides responsive, quality “C” school training courses to Navy personnel in the FCAs. The restructuring/ re-engineering of the delivery of “C” school training courses encompassed utilization, no current training in the local area, and with direct application to the private sector. These courses were contracted for instructional services with the objective of obtaining proficiently trained students meeting required

performance and course completion standards. Sailors receive college credit through the American Council on Education (ACE) and/or industry certifications for “C” school courses.

Today the Center for Service Support (CSS) and Center for Naval Engineering (CNE) initiate requirements to establish contractual actions to provide local alternative training sources at the various FCAs, including Norfolk, Naval Surface Group Pacific Northwest (PACNORWEST), and Pearl Harbor.

CSS and CNE provide Navy oversight and curriculum clarification/ direction for course revision or modification. Along with the Training Support Centers (TSCs), they provide student management and contract oversight by Contracting Officer Representative (COR) appointment. This creates a business opportunity for vendors capable of providing the required instruction for Navy training courses.

NAVY “C” SCHOOLS:

CNE courses taught at various FCA

| CIN | Course |
|--------------|---|
| • J-662-0023 | 400HZ Motor Generator Electrical System Maintenance |
| • A-702-0024 | Advance Milling |
| • A-702-0029 | Advanced Machinery Repair |
| • A-651-0088 | Electronic Automatic Boiler Control Console Maintenance |
| • A-651-0089 | Electronic Automatic Boiler Control Console Operator |
| • A-651-0094 | Electronic Automatic Boiler Control Auxiliary |
| • J-662-0044 | Electrical Control Devices |
| • A-702-0023 | Heavy Machinery |
| • A-702-0021 | Heat Treat Metal |
| • A-720-0009 | Microprocessor |
| • A-702-0022 | Precision Grinding |
| • A-651-0047 | Propulsion Alarm and Indicating Systems Maintenance |
| • A-720-0010 | Refrigeration and Air Conditioning Systems Technician |
| • K-652-0063 | Woodward Governor Maintenance |
| • K-495-0045 | General Shipboard Fire Fighting Training |
| • J-495-0419 | Advanced Shipboard Fire Fighting Training |
| • J-495-0418 | Shipboard Fire Fighting Training, Team |
| • A-495-0018 | Shipboard Fire Fighting with Self-Contained Breathing Apparatus |

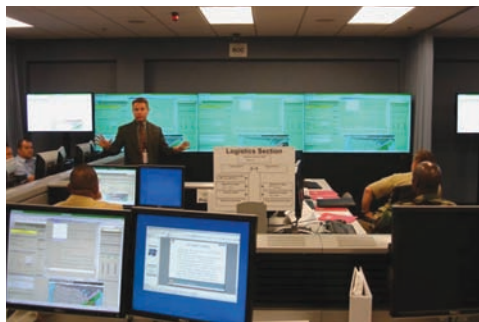


CSS courses taught at various FCA

| CIN | Course |
|--------------|--|
| • C-551-2019 | Aviation Supply Specialist |
| • A-542-0013 | Disbursing Clerk Travel. Pay |
| • A-542-0014 | Disbursing Clerk Fiscal Prod |
| • A-542-0015 | Disbursing Clerk Auto Pay Sp |
| • C-555-0050 | Nalcomis OPT SAA |
| • A-840-0013 | Shipboard Barber |
| • A-551-0085 | Supply and Accounting Operating Management |
| • A-800-0015 | Food Service Administration |
| • A-800-0030 | Galley Watch Captain |



SHORE FORCE TRAINING CENTER (SFTC)



Commander, Navy Installations Command (CNIC) is the authority responsible for the Navy’s shore installation management. The CNIC enables and sustains Naval forces from the shore by designing, developing and delivering integrated shore capabilities to the Fleet, the Fighter, and the Family. On any given day, CNIC programs service every shore-based ship, submarine and aircraft and take care of every Sailor, their families, civilians, and contractors. VADM Vitale, CNIC, says it best, “The Fleet can’t begin to sail, submerge, or fly unless they start

from the shore, and you can’t support them or our fighters and families without the right programs and facilities – and only one Command can do that – Navy Installations Command.”

The Naval Air Warfare Center Training Systems Division (NAWCTSD) supports the CNIC mission by analyzing, designing, developing, and implementing training and courseware products within a variety of CNIC areas, including Fleet Readiness, Family Readiness, Housing, Base Support, and Operating Forces Support. CNIC leadership guidance challenges everyone within the organization to “Always looking for a better way.” That is the standard by which NAWCTSD designs, develops, and implements training products for CNIC. Because of the global span of the Command, NAWCTSD is challenged to select and field a variety of instructional delivery methods to support the varied training requirements, platforms, and audience.



SHORE LEADERSHIP TRAINING CENTER (SLTC)



The Shore Leadership Training Center (SLTC) provides quality leadership development opportunities for entry, intermediate, and executive military and civilian leaders of the Navy Installations Command global enterprise via innovative, effective, and efficient delivery methods which support training and education initiatives, professional workforce development, and personal goal-setting. It is the Shore's standard for leadership development training and education. NAWCTSD has been instrumental in designing, developing, and evaluating the Senior Shore Leadership course for pre-command Commanding Officers, Executive Officers, Command Master Chiefs, Department Heads and the Regional University program for all new CNIC employees with follow-on training specific to senior leadership. Both courses feature interactive, instructor-led training, rich media, and virtual offices to support training and reach-back.

SHORE TRAINING CENTER (STC)

The Shore Training Center (STC) is a war gaming center with an advanced classroom environment that executes the primary mission areas of Command, Control, and Communications (C3) training and assessment. STC serves as Exercise Control for national training events and conducts individual and unit level training that includes the Region and Emergency Operation Centers and

Emergency Preparedness. The STC also supports the Homeland Security Presidential Directive requirement that all levels of the Government possess the capability to work efficiently and effectively together using a national approach to incident management. NAWCTSD developed hands-on, instructor-facilitated, emergency management training that progressively builds from incident occurrence to operation deactivation. STC, with the assistance of NAWCTSD, provides effective and cost-wise training and readiness ashore, and enables interoperable training with Navy, Joint, and host nation forces, as well as civil authorities.

FLEET AND FAMILY READINESS (FFR)



The Fleet and Family Readiness (FFR) division includes many Morale, Welfare, and Recreation (MWR) programs and services. These programs include: fitness and sports, deployed support, libraries, golf, bowling, marinas, and outdoor recreation. The FFR is instrumental in providing programs and services through Fleet and Family Support Centers, such as relocation assistance, information and referral, financial management counseling, spouse employment services, family advocacy, and the transition assistance program. NAWCTSD supports the FFR by designing and developing online, collaborative, and facilitated courses for FFR. These non-traditional courses feature intensive 8-10 day learning events which use real data from the



students' work environments, electronic job aids, videos, and avatars to provide engaging and meaningful learning and work experiences.

The Navy Housing division is responsible for the overall management of all housing Navy-wide, including permanent party family housing and bachelor quarters. Through its public-private venture (PPV) mission, the Navy is revitalizing military housing by partnering with private sector developers to offer quality, affordable housing communities. To support the requirements of the Housing division, NAWCTSD analyzed and has completely restructured the entire Housing Curriculum. The analysis package features structured and aligned objectives across the entire curriculum and provides the individual WITH A TRAINING PIPELINE. Core audience members for each course and who others might benefit from the training.

EMERGING TECHNOLOGIES

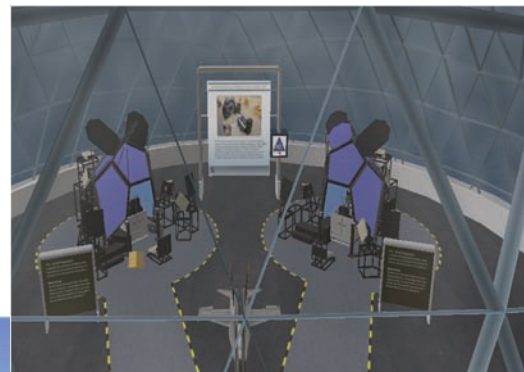
NAWCTSD's Emerging Technology (ET) Integrated Product Team (IPT) is exploring current and future technologies to address the training needs of civilian and military personnel and to showcase our products and services. Of great interest to NAWCTSD is the possibility of utilizing virtual worlds

to create immersive training environments and utilizing mobile technologies to distribute information and training content.

Products and Services Island: NAWCT3D

The NAWCTSD Products and Services Virtual World (known as Naval Air Warfare Center Training in 3 Dimensions (NAWCT3D)) utilizes the Second Life Virtual World to experience the Products and Services developed by NAWCTSD and attract the attention of highly skilled potential future employees.

Once you are immersed in the program, your avatar can observe information regarding Aviation, Surface, Undersea, and Cross Warfare Directorates. For each of these Directorates, avatars have the ability to explore training simulators such as the flying the F/A-18 aircraft; experiencing fire and smoke in a virtual version of the Navy's Battle Stations 21 simulator, or observing a submarine undersea training system called MRTS (Multi-Purpose





Reconfigurable Training System). NAWCTSD is very proud of our product and services which are critical to providing solutions to enhance the capability of the nation's Warfighters.

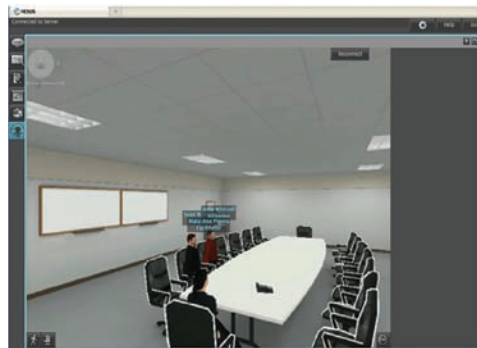
Just as important is the quality of life for our workforce. Your avatar can explore many of the quality of life activities available in the organization, such as a fitness gym where your avatar can run on a treadmill and lift weights.

<http://slurl.com/secondlife/>
(Search for NAWCT3D)

Acquisition Integrated Product Team (IPT) Virtual World

The area of utilizing virtual worlds and social networks for education is a relatively new concept that NAWCTSD believes can directly enhance its Acquisition Technology and Logistics (AT&L) workforce. However, further innovations are necessary in order for these capabilities to reach their full potential. As part of NAWCTSD's path to the next generation learning environment, we have developed a persistent, collaborative virtual environment to train our acquisition workforce on:

- ◆ Establishing, leading, and managing Integrated Product Teams (IPTs)
- ◆ Developing IPT Charters
- ◆ Writing sections of an Acquisition Plan
- ◆ Writing marketing survey questions
- ◆ Practicing conflict resolution
- ◆ Identifying potential risks related to performance or technical areas, cost, and schedule



PARACHUTE STATIC LINE AND FREEFALL SCHOOL OF THE U.S. NAVY



A study conducted in the 1990s concluded that current Department of Defense training facilities did not have the capacity to support U.S. Navy parachute training requirements.

As a result, the Naval Special Warfare Advanced Training Command (NSW ATC) tasked the Naval Air Warfare Center Training Systems Division (NAWCTSD) to perform a training analysis and determine the feasibility for instructional support and training services in the delivery of Navy parachute training in the San Diego, California, area. This service will include fully qualified instructors and contractor personnel who are capable of providing the required instructional support and training services associated with the delivery of the Navy Static Line (CIN: A-431-0135) and Freefall (CIN: A-431-0136) parachute courses under the coordination of NSW ATC.

As the established Command for providing solutions to Naval Aviation training requirements, NAWCTSD was poised to quickly evaluate the training requirement and provide NSW ATC with multiple solutions.



The procurement process was immediately implemented and a parachute training contract was established for NSW ATC.

For over a decade, NAWCTSD has been providing customers with quality parachute training support. Currently, the Parachute Static Line and Freefall School of the U.S. Navy includes students from the U.S. Air Force, U.S. Marines, and the U.S. Army.

NAVAL RESERVE OFFICER TRAINING (NROTC) MARITIME SKILLS SIMULATOR (MSS) CLASSROOMS



The Naval Reserve Officer Training (NROTC) Maritime Skills Simulator (MSS) program was launched in September of 2007 following the combined installation of MSS and COVE at Jacksonville University in Jacksonville, Florida. The MSS provides a configurable, scalable, and expandable system to support the NROTC navigation requirements for training.

The software – which creates experiential opportunities for students to focus on navigation, ship handling, engineering, weapons systems, and Naval operations – which facilitates real-time computer enhanced simulation and modeling, is being used at 19 Naval ROTC units across the country. The software, SUBSKILLSNET, is specifically designed and developed by NAWCTSD for Navy Schoolhouses and the MSS's.

The MSS classrooms allow NROTC midshipmen to train with the same tools they will be using when they arrive in the fleet. This prepares them to immediately function in the modern shipboard environment once they receive their commissions as Navy ensigns. These MSS classrooms represent the incorporation of technology to enhance the learning experiences of future Navy and Marine Corps officers.

INTERNATIONAL PROGRAMS

The Program Director for International Programs (PDI) manages training programs, systems and products to support the training needs of our international partners. PDI leverages the experience, knowledge and resources of the other Program Directorates to deliver equivalent training solutions that are provided to the U.S. Navy Commands. To this end, PDI is currently supporting approximately 40 partner nations, and providing training solutions across the full spectrum of NAWCTSD products. PDI is the primary training systems point-of-contact for the Defense Security Cooperation Program, distributing policy guidance and standardized procedures in the execution of Foreign Military Sales (FMS) cases. In addition, PDI coordinates foreign disclosure, export licensing and foreign visit requests for the command, as well as partnering with the Navy International Program Office (Navy IPO) in the development of responses to Price and Availability (P&A) and Letters of Request (LOR) from our international partners.

PROGRAMS IN THE INTERNATIONAL PROGRAMS DIRECTORATE

The International Programs Directorate is the action agent for the full range of NAWCTSD's air, surface, undersea, and special mission training systems for international partners of the United States. The following are just a few examples of the Directorate's successful overseas programs.

E-2C AIRCRAFT OPERATIONAL FLIGHT TRAINER (OFT)



The E-2C OFT provides a realistic training environment for the pilot and copilot in the areas of flight, navigation and communications peculiar to the E-2C aircraft. The training system promotes initial qualification, transition, requalification proficiency and tactical flight training under instrument flight

conditions. The operational flight training objectives include cockpit familiarization and an in-depth understanding of the E-2C flight characteristics, normal procedures and emergency procedures. This E-2C OFT is a fully simulated replica of the E-2C cockpit. It is a completely operational flight trainer that incorporates a six-degrees-of-freedom motion system, a four-window dusk/night visual system, and an audio system. All this is achieved at a cost significantly lower than training on the actual aircraft.

FIRE FIGHTING TRAINING UNIT (FFTU)

The FFTU is a Maritime Fire Fighter Trainer. The FFTU is a propane powered and computer controlled



device resembling a military ship. The FFTU simulates several types of shipboard fires including: engine room, bilge, motor/generator, electrical panel, radar console, berthing and helicopter deck/dockside fuel spill fires. The FFTU has integrated safety controls throughout.

FULL MISSION BRIDGE TRAINER (FMBT)/ MULTIFUNCTION CUBICLE (MFC)



The FMBT/MFC is a Maritime Ship Handling and Navigation Trainer. The systems provide training in coastal piloting, inland navigation, ocean steaming, emergency response, harbor maneuvering, mooring, and anchoring in all weather conditions. In addition, the system allows for interactive exercises between two crews on the separate bridge mockups.

NAVAL TACTICAL TEAM TRAINER (NTTT)



The NTTT provides battle group, tactical team, and individual operator training. The NTTT incorporates high fidelity platform, weapon, sensor, and environmental simulation modeling to support the required level of tactical decision making needed in anti-air, anti-surface, anti-submarine, multi-threat, and combined warfare operations. The NTTT consists of:

10 training cubicles with 10 student workstations each; a trainer control/debrief complex; and peripheral equipment located in both the trainer cubicles and the control room. All the equipment is connected by a local area network.



RESEARCH AND TECHNOLOGY





The Research and Technology Office (4.6T) manages the NAWCTSD training technology research and development programs. These include the Office of Naval Research (ONR) sponsored programs in Basic Research (6.1), Applied Research (6.2), Advanced Technology Development (6.3), Small Business Innovative Research (SBIR)/Small Business Technology Transfer (STTR) and Transition Research, the Navy Science Advisor Program (ONR Global Fleet/ Forces), and Technology Transfer. Under the cognizance of 4.6T, NAWCTSD maintains a very rigorous Human Research Protection Program (HRPP). Under the HRPP there is an Institutional Review Board that reviews all research and experimentation that involves the use of human subjects. 4.6T also manages NAWCTSD non-navy sponsored research and development in support of Commands and agencies such as Joint Forces Command, Department of Homeland Security, TRICARE Management Activity and Defense Equal Opportunity Management Institute (DEOMI).

RESEARCH FOCUS I:

HUMAN PERFORMANCE MODELING & ASSESSMENT (HPMA)

Human performance modeling analyzes underlying knowledge, skills and abilities (KSAs) to predict performance across a variety of systems and contexts. Human performance assessment includes the ability to accurately measure and analyze performance on domains ranging from simple procedural skills to complex cognitive skills in individuals, teams, and organizations. Better modeling and assessment technologies and techniques will enable future training systems to account for differences in aptitude and learning style, permitting training to be tailored to the needs of specific individuals and teams.

ADAPTIVE TRAINING FOR SUBMARINE PILOTING AND NAVIGATION



The Commander, Submarine Forces has identified requirements to improve training of high-level decision making skills for submariners. This project seeks to develop an intelligently adaptive training system, tailored to the strengths and weaknesses of individual trainees, for submarine Piloting and Navigation teams. The production of effective adaptive scenario-based training poses scientific challenges with regards to performance measurement and modeling in that a diverse set of human-centric performance data (e.g., timing, accuracy, communication patterns, and individual differences) must be captured, integrated, and computationally represented in multi-dimensional hybrid models. This program is sponsored by the Office of Naval Research under the Future Naval Capabilities Program.



ADAPTIVE TRAINING FOR COMBAT INFORMATION CENTER TEAMS

This project seeks to develop adaptive training interventions to meet the Train to Quality and Train to Certify strategies for the Littoral Combat Ship. Although the concept of adaptive training systems had been discussed in the academic literature for decades, its application to complex training environments, especially team training environments, has been limited. By integrating on-task monitoring capability into damage control, bridge, and engineering simulators, the training systems developed under this project will adapt to the aptitudes, learning styles, and learning preferences of individual trainees and teams to provide a more effective and efficient training evolution. This program is sponsored by the Office of Naval Research under the Future Naval Capabilities Program.

PERFORMANCE SHAPING FUNCTIONS FOR ENVIRONMENTAL STRESSORS

The Performance Shaping Function S&T effort is intended to improve the fidelity and accuracy of human performance modeling algorithms used to support system acquisition and development. The objectives of this effort are to conduct research to acquire human in the loop data that can be used to identify impact of Navy relevant environmental stressors (sea state, fatigue, ambient temperature) on human performance. With these data models and algorithms representing these impact of environmental stressors (alone and in combination) on human performance can be developed and validated. This program is sponsored by the Office of Naval Research under the Future Naval Capabilities Program.



RESEARCH FOCUS II:

VIRTUAL ENVIRONMENTS & TRAINING TECHNOLOGY

Virtual Environments (VEs) can augment Warfighter preparedness by providing training opportunities that might not be available due to factors such as cost, safety, and resources. Three components of VE training include technology, human, and evaluation. The technology component includes the ability to provide realistic rendering and modeling, multi-sensory input/output devices, and system interconnectivity and delivery. The human component includes the ability to train at different levels of task performance from motor skills to complex cognitive skills while taking into account user interaction issues and individual differences. The evaluation component involves assessing the effectiveness of the VE training system via formalized training effectiveness evaluations, transfer of training, and training fidelity.



NEXT GENERATION HELMET MOUNTED DISPLAY (HMD) FOR TRAINING SYSTEMS

The objective of the Next Generation HMD for Training Systems is to provide software-based algorithm solutions to mitigate observable system latency resulting from multiple system processes such as complex image generation and high-speed head tracking and hardware-based design solutions to reduce image

alignment error from HMD symbology overlaid upon complex Out-the-Window (OTW) graphics.

ADVANCED USE OF FORCE TRAINING SYSTEM

A use of force training system has been developed that incorporates significant advances in speech recognition, graphics rendering and scenario generation tools that make it possible to build reconfigurable and interactive training scenarios for simulation based training.



RESEARCH FOCUS III:

TACTICAL DECISION SUPPORT FOR COMMAND & CONTROL

Significant advances in Naval capabilities, such as the increased numbers and types of sensor systems, the use of multiple autonomous vehicles, and the increased flow of intelligence information, present a significant challenge for our Warfighters. The purpose of Tactical Decision Support for Command and Control research is to advance the state of the art in automation and artificial intelligence in support of decision-making and mission planning to reduce stress and information overload while increasing consistency and confidence in decisions.

UNMANNED AERIAL SYSTEMS CROSS PLATFORM STUDY

Many aspects of Unmanned Aerial System (UAS) control interface requirements are shared between all military services. The AVID program seeks to support a common interface to the unmanned vehicle community. In doing so, the UAS community is presented with the opportunity to provide a coherent common picture, streamlined training, and increased likelihood of adapting common interfaces between vehicle models. The AVID program also seeks to



identify and document shared display requirements for Navy UASs. Human Centered Interoperability for Network Enabled Operations.

RESEARCH FOCUS IV:

HUMAN SOCIAL CULTURAL & BEHAVIORAL MODELING

Human Social Cultural and Behavioral Modeling research applies recent developments in behavioral modeling, individual and distributed team performance, culture, and collaborative/learning support technologies to the problem of joint/coalition decision making in irregular warfare environments. Social and cultural behavioral modeling is a specific application of human performance to analyze and predict behavior in culturally-embedded contexts. It involves developing human performance models that are operable in a variety of plug-and-play environments to support analytical, planning, and training applications in the Navy and other DoD and National Intelligence communities.

EQUAL OPPORTUNITY ADVISORS (EOA) & EQUAL EMPLOYMENT OPPORTUNITY FRONT END ANALYSIS (FEA) & EOA PERFORMANCE



NAWCTSD provides research and FEA support to the Defense Equal Opportunity Management Institute (DEOMI). Recent focus has been on conducting a Job Task Analysis for both current and new courses offered for both Equal Opportunity Advisors (EOAs in the military) as well as those in the roles involving Equal Employment Opportunity (EEO for civilians). The team consists of NAWCTSD colleagues as well as DEOMI personnel in Research and in Training Development. The courses include: EOA Program, EEO Counselor and EEO Specialist.

As a follow on to the EOA FEA Program FEA, NAWCTSD is involved in an effort to identify barriers and enablers to effective EOA performance. This effort focuses on first developing,

understanding, and validating the Service Specific models that involve the EOA themselves and EOA Program – relationships between EOAs and internal/external team members, who they report to and receive tasking from, how they are utilized, and how their performance is measured.

THE INFLUENCE OF CULTURAL DISTANCE ON TRUST DECISIONS

The DoD has identified the critical need to improve cross-cultural competence for all military personnel. These requirements are in response to the changing nature of military operations abroad. The objective of this research is to validate an adapted model of trust by using a policy capturing method to determine the trustworthiness cues that are most consistently used when making the decision to trust. This program is sponsored under the NAWCAD In-house Laboratory Independent Research Program.

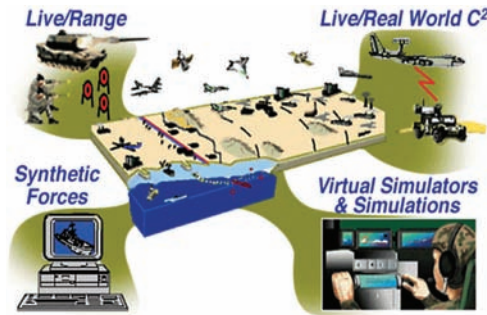


RESEARCH FOCUS V:

DISTRIBUTED LIVE, VIRTUAL & CONSTRUCTIVE SYNTHETIC TRAINING

The ability to train and interact in a large-scale distributed simulation network is critical to DOD and allied partners to allow warriors to, interact, train, and learn in an operationally realistic environment.

LIVE, VIRTUAL, & CONSTRUCTIVE (LVC) TRAINING



The Naval Science and Technology Strategic Plan cites the need for optimized physical readiness and enhanced cognitive performance as well as immersive, synthetic systems for training and education.

The current effort will define the state of the art in LVC training science and technology and establish product line success metrics in support of transition. This effort will define the S&T questions that underpin products of the three LVC enabling capability product pillars: Virtual Constructive Representations on Live Avionics Displays, Optimal Fidelity of Synthetic Environments, and Tactically Behaving Semi-Automated Forces. The proposed effort involves (1) the development of a model of the fidelity of human behavior representation required to meet a defined set of training objectives and task type, (2) conducting an experiment in which fidelity is systematically manipulated to evaluate the predictive value of the model, and (3) development of a symbology set for merging constructive and virtual assets into cockpits safely.

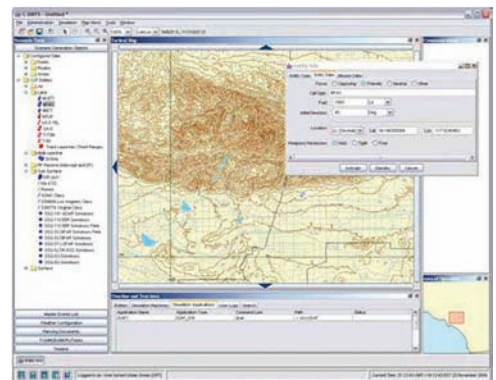
This program is sponsored by the Office of Naval Research under the Future Naval Capabilities Program.

TACTICAL ENVIRONMENT ROLE-PLAYER STATION

There is a critical need in aviation simulation-based training to provide instructors with a single graphical user interface (GUI) to monitor and control networked, mixed fidelity tactical environments. One example of this is the P-8A program which is addressing how to handle reductions in manpower for weapons tactics, operational flight, and full crew training, while the job of the P-8A instructor is expanding to support mission fidelity, networked training requirements in a user-friendly and effective manner.

The objective of this program is to enable instructors to plan, monitor and control the tactical environment, manage the network, perform sophisticated performance assessments through automated data capture and support data link role playing from a single GUI. Instructors will be provided with guidance on which models best support the training objective based upon level of fidelity required.

This program is sponsored by the Office of Naval Research under the Technology Investment Program for Savings.





DOING BUSINESS WITH NAWCTSD





CUSTOMERS

The Program Directors (PDs) are responsible for accepting and executing projects assigned to NAWCTSD. The primary point of contact will be the Program Director responsible for the warfare area most closely aligned with the customer. Accordingly, all work is assigned to one of the PDs (i.e., Aviation, Surface, Undersea, Cross Warfare, International, Research and Technology).

Those work assignments may reach NAWCTSD through a variety of methods. The most common approach for Navy customers is via the Systems Commands (Naval Air Systems Command-NAVAIR, Naval Sea Systems Command-NAVSEA, and Space and Naval Warfare Systems Command-SPAWAR). In those cases, the Chief of Naval Operations (OPNAV) resource sponsor determines the validity and relative need of a respective task, allocates resources, and tasks the appropriate Systems Command (SYSCOM) to manage the project. In turn, the SYSCOM tasks NAWCTSD to execute the task (for example, the acquisition of a new helicopter trainer, or conduct a training skills and requirements analysis for a new ship class). The mechanism for gaining access in this method is to elevate the requirement through the applicable operational chain of command to obtain the OPNAV resource sponsor's support.

Direct access is the second most common method. Customers (Navy Program Executive Officers-PEOs/Program Managers-PMs; Sister Services; Non-DOD Training Agents) may request NAWCTSD directly to support their respective needs. Allied military may also access us with a letter of request from their embassy to the Navy International Programs Office. This avenue is typically conducted on a reimbursable basis where the customer provides requisite resources direct to NAWCTSD to enable project execution. Resources include project funds, travel funds, and in-house salary funds. Key components include available skill mix and the necessary depth of skills.



TRAINING SUPPORT CONSIDERATIONS

To understand your request for training support from NAWCTSD we will typically ask the following type of questions:

1. General Information

- a. Command
- b. Primary Point of Contact (POC)
- c. Mission
- d. Funding Sponsor
- e. End User Primary Command or Organization
- f. End User Primary POC
- g. Sustainment Sponsor (if applicable)
- h. Project Description
- i. Source of Requirement
- j. Level of Security Classification

2. Budget Information

- a. Funding Type
- b. FY available
- c. Funding Expiration Date
- d. Funding Amount

3. Characteristics

- a. Relationship of requirement to other training systems, devices or courses in the achievement of the learning objectives
- b. Current Training Hours by Delivery Method
- c. Student Throughput
- d. Support Requirements
- e. Known Program Constraints/Risk
- f. Environmental Issues

4. Delivery or Training Sites and Facilities Information

- a. Number of sites
- b. Location(s)
- c. Building Number(s) – if applicable
- d. Room(s) – if applicable
- e. Installation Impact
- f. Additional facilities required?

5. Requested Products and Processes

- a. Training Devices and Simulators
 - i. New Effort or Modification
 - ii. Type of Training (Part Task; Team; Tactical; Operators; Maintenance; FST Capable; Weapon Range; Mission Planning; CBT; Other)



- iii. Type of Effort (Trainer Functional Upgrade; Trainer Maintenance Upgrade; Trainer; Repair; Software Upgrade; Electronic Classroom Upgrade; Trainer Relocation; Parts Buy; Learning Resource Center Upgrade; Disposal of Training System; Embedded Training in Op Equipment; Other)
- b. Training Content
 - i. Training Delivery System (Intranet; MarineNet; Internet; Army On-Line; NMCI; NKO; Other)
 - ii. Courseware Development
 - iii. Curriculum
- c. Services
 - i. Contract Instructor Services
 - ii. Contractor Support Services
 - iii. Procurement of Government Services
 - iv. Contractor Operation and Maintenance Services (COMS)/ Fielded Training System Support (FTSS)
- d. Intellectual Services Support/Services
 - i. Front End Analysis
 - ii. Training System Requirements Analysis
 - iii. Design Requirements
 - iv. Workyear Support
 - v. Research and Development

CONTRACTORS

It is DOD Policy that a fair proportion of its total purchases (contracts and subcontracts) be placed with small business. NAWCTSD is strongly committed to the use of small business in meeting of its acquisition requirements. As a major contracting office, NAWCTSD maintains a full-time Deputy for Small Business who reports directly to the Commanding Officer.

The NAWCTSD Office of Small Business Programs is the central point of contact for small businesses desiring to do business with the Naval Air Warfare Center Training Systems Division. For information to assist you in your self-marketing efforts contact:

Deputy for Small Business

E-mail: ORLO_NAWCTSD_Small_Business_US@navy.mil

Phone: (407) 380-8253, Fax: (407) 380-4487

If you have not done business with the government yet, there are several steps you need to follow:

STEP 1: Identify your Product or Service

Know the Federal Supply Classification (FSC) Code and North American Industry Classification System (NAICS) Code for your product or service. Many government product/service listings and future procurements are identified by FSC or NAICS Code

FSC Codes: <http://www.dlis.dla.mil/hcfsch21.asp>

NAICS Code: <http://www.census.gov/epcd/www/naics.html>



STEP 2: Obtain DUNS Number, register in CCR System, and obtain a CAGE Code

Dun and Bradstreet maintain the DUNS company identifier system utilized by both government and corporate officials searching for background information on companies.

To obtain your DUNS number, go to: <http://www.dandb.com/businessdirectory-landing/>

You must be registered in the Central Contractor Registration (CCR) to be awarded a contract from the DOD. The CCR is a database designed to hold information relevant to procurement and financial transactions.

To register, go to: <http://www.ccr.gov/>

A Commercial and Government Entity (CAGE) Code is a five-position code that identifies contractors doing business with the Federal Government, NATO member nations, and other foreign governments. The CAGE Code is used to support a variety of mechanized systems throughout the government and provides for a standardized method of identifying a given facility at a specific location. The code may be used to request a facility clearance, a pre-award survey, automated bidders lists, identification of debarred bidders, fast pay processes, etc.

The CAGE Code request process is now incorporated in the CCR registration. Therefore, upon activation in CCR, your company will be assigned a CAGE Code. Notification of your new CAGE Code is by letter via the US Postal Service. The CAGE notification is sent to the person listed under the "Registrant Name" in the registration documentation. In addition, once your registration is active you may view your CAGE code on the web by searching the active registrations.

Search Active Cage Codes are available at: <http://www.the8amentor.com/?p=2867>

STEP 3: Familiarize yourself with Federal, DOD, and Navy Contracting Procedures

Be familiar with Federal Acquisition Regulations (FAR), the Defense Federal Acquisition Regulation Supplement (DFARS), and the Navy Marine Corps Acquisition Supplement (NMCARS).

◆ FAR: www.arnet.gov/far

◆ DFAR: <http://www.acq.osd.mil/dpap/dars/dfarspgi/current/index.html>

◆ NMCARS: <http://acquisition.navy.mil/content/view/full/3464>

"Understanding How To Do Business With the Navy" web page on the Navy's Research Development and Acquisition site contains many documents to facilitate doing business with us.

◆ <http://acquisition.navy.mil/content/view/full/186>





STEP 4: Identify Current and Future NAWCTSD Procurement Opportunities

Federal Business Opportunities (FedBizOpps) has been designated as the single source for all federal government procurements opportunities that exceed \$25,000. All agencies must use FedBizOpps to provide the public access and notice of procurement action over \$25,000. For Navy specific procurements you should also visit the Navy Electronic Commerce On-line (NECO) The World of Navy electronic Business Opportunities NECO is the centerpiece of the Navy's paperless process strategy.

All TSD requirements over \$15,000 are synopsisized and solicitations are posted in FedBizOpps and Navy Electronic Commerce On-line (NECO). Use N61340 for solicitation search.

FedBizOpps website: www.fbo.gov

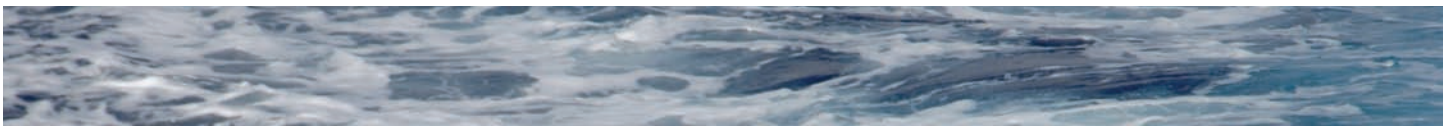
NECO website: <https://www.neco.navy.mil>

For further information on doing business with NAWCTSD, please contact our Business Support Team by telephone at (407) 380-4763, by e-mail at **orlo_businesssupportteam@navy.mil**, by fax at (407) 381-8744, or by mail at Business Support Team, NAWCTSD, 12350 Research Parkway, Orlando, FL 32826.



EMPLOYMENT WITH NAWCTSD





◆ **USAJOBS:** <http://www.usajobs.gov/>

The official jobs web site of the U.S. Government is USAJOBS (www.usajobs.gov). USAJOBS provides Federal job listings for all agencies. USAJOBS Resume Builder allows for more than one resume to be maintained and has robust search and notification features. You can set search and notification criteria for NAWCTSD employment opportunities and be notified when job announcements are posted. For additional information about student jobs, veteran's information and current job openings at NAWCTSD see our Employment Opportunities page on our web site.

◆ **Employment Opportunities NAWCTSD:**

<http://nawctsd.navair.navy.mil/AboutUs/EmpOps/Index.cfm>

Military personnel should coordinate with their respective detailers regarding future billets that are scheduled for availability. NAWCTSD maintains a select cadre of Fleet experienced Sailors whose subject matter expertise is critical to acquisition of training solutions. The wardroom is comprised of several warfare designators and specialties such as Aerospace Engineering Duty Officers, Acquisition Corps members, Supply Corps, Limited Duty Officers, Aerospace Maintenance Duty Officers, and Medical Services Corps. Most Chief Petty Officers (E-7/8/9) billets exist to provide the vital knowledge and experience that represents the needs of Fleet Sailors. Prior formal acquisition training as mandated by the Defense Acquisition Workforce Improvement Act (DAWIA) is desired; however, it may be completed after reporting aboard.



PHONE DIRECTORY





To use this directory, insert one of the following prefixes before the extensions.
 (Example: to get information desk from commercial network dial (407) 380-4000)
 Commercial: (407) 380-[extension]
 Defense Switch Network (DSN): 960-[extension]

COMMAND SECTION

Commanding Officer, Executive Officer 8128
 Technical Director, Deputy Technical Director 8129
 Acquisition Policy and Business Planning Manager 4763

PROGRAM MANAGEMENT GROUP

Aviation Programs Directorate 4595
 Surface and Expeditionary Warfare Programs Directorate 4029
 Undersea Programs Directorate 4160
 Cross Warfare Programs Directorate 8085
 International Programs Directorate 4419

CONTRACTS GROUP, TRAINING SYSTEMS CONTRACTS DIVISION

Training Systems Contracts Division 4121
 Associate Director For Training Systems Contracts Division 8037
 Deputy for Small Business 8253

RESEARCH & ENGINEERING GROUP, HUMAN SYSTEMS DEPARTMENT

Director Research and Engineering Dept.,
 Associate Dir - AIR 4.6 Human Systems Dept. 8371
 Science and Technology Office 8218

LOGISTICS & INDUSTRIAL OPS GROUP

Director Logistics and Industrial Ops Group 4900
 Deputy Director Logistics and Industrial Ops Group 4896

CORPORATE OPERATIONS GROUP

Security Department 8249
 Public Affairs Department 4691

I/ITSEC





THE INTERSERVICE/INDUSTRY TRAINING, SIMULATION AND EDUCATION CONFERENCE (I/ITSEC)

The Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC) promotes cooperation among the Armed Services, industry, academia and other national and international organizations in pursuit of improved training and education programs, identification of common training issues, and development of multiservice programs.

NAWCTSD was a charter participant in the first such conference when it was initiated in 1966 as the Naval Training Device Center/Industry Conference. The conference has evolved and expanded to include the Army, Air Force, Marine Corps, Coast Guard, and other Federal agencies.

Each year, engineers from NAWCTSD demonstrate a wide variety of advanced training solutions for aviation, surface, undersea, land, and specialized requirements. NAWCTSD Business Support personnel are also on hand to discuss business opportunities with members of industry.

The conference is scheduled to be held at the Orange County Convention Center on International Drive in Orlando, Florida, through 2014. Tentative dates for future conferences, subject to confirmation by conference organizers, are:

2011: Nov. 28 - Dec. 1

2012: Dec. 3 - 6

2013: Dec. 2 - 5

2014: Nov. 17 - 20

Our I/ITSEC booth is always centrally located on the conference exhibition floor. We would welcome the opportunity to meet you.

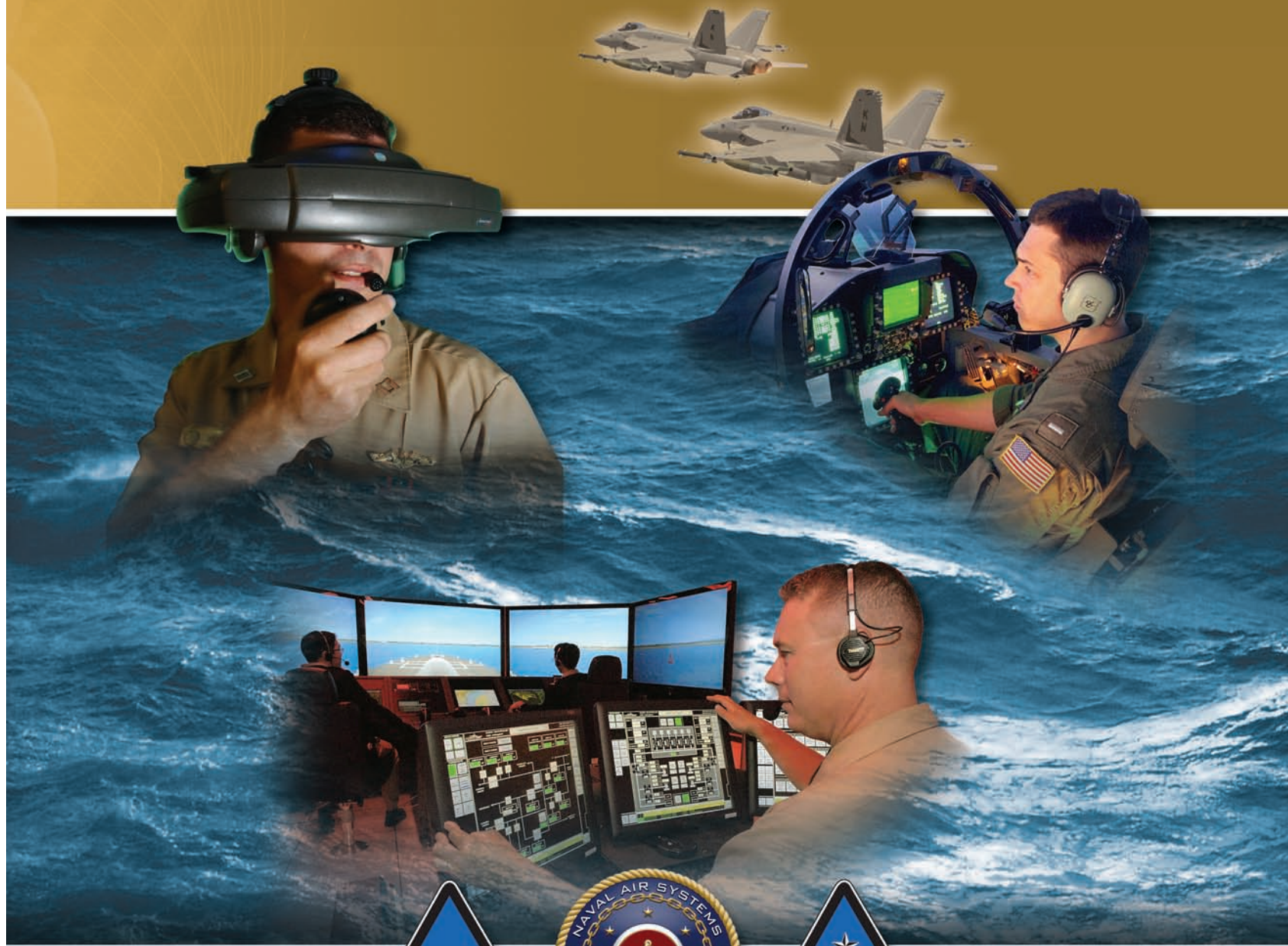
BUSINESS SUPPORT TEAM

E-MAIL: ORLO_BUSINESSSUPPORTTEAM@NAVY.MIL

PHONE: (407) 380-4763

FAX: (407) 381-8744

NAWCTSD.NAVAIR.NAVY.MIL



PUBLIC AFFAIRS OFFICE

PHONE: (407) 380-4691/4870/8372

E-MAIL: ORLO_PAO@NAVY.MIL