Navy

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Once again, NTSA is proud to have sponsored an effort which has resulted in a comprehensive assessment of future needs in the training and simulation markets. This year's effort was especially difficult because of the increased security and extensive budget changes.

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The Navy Committee conducted customer interviews, research, and authored the market survey reports. The Navy Committee members are listed below:

- Dan Deschnow, Vice President, Aero Simulation, Inc. (Co-Chair)
- Phil Voss, Chief Corporate Development Officer, LSI (Co-Chair)
- Mike French, Vice President, Navy Surface Warfare Programs, LSI
- Terry Lewis, President, Binghamton Simulator Company
- Rick Pray, President, RPA Electronic Solutions, Inc.
- David Spears, Program Director, Aero Simulation, Inc.
- Audrey Weber, Director, CSC

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RADM Fred Lewis (U.S. Navy Ret.), President

National Training Systems Association
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“The mission of the Navy is to maintain, train and equip combat-ready Naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas.”


1.0 Introduction

Training 2015 – Navy presents information to assist industry’s support of the US Navy current and future training needs. The information provided was gleaned through personnel interviews, government documents, and other source material obtained through internet research.

To fully understand the current status of training and education programs in the Navy’s planning and budget process, it is important to recognize several significant changes in Navy organizational and planning concepts over the past five years. Since the release of the NTSA “Training 2012” study in 2006, discussions and dialogue regarding education and training in Navy planning have shifted from an overarching plan that stemmed from an earlier concept known as the “Revolution in Training” to a very focused view of operating and evaluating Navy warfighting forces - and the training and education required for those forces - using “best business practices.” This new focus is called the Naval Enterprise Concept.

From 2001 through 2006, the Navy integrated Fleet Warfare entities into the overall Navy Enterprise Framework. The Navy Enterprise is now supported by five individual Warfare Enterprises for each major war fighting area:

1. Naval Aviation Enterprise (NAE)
2. Surface Warfare Enterprise (SWE)
3. Undersea Warfare Enterprise (USE)
4. Naval NETWAR/FORCENET Enterprise (NNFE)
5. Navy Expeditionary Combat Enterprise (NECE)

The primary missions of the five Warfare Enterprises are to deliver warfighting capabilities with units “ready for tasking” via an “Integrated Training Process”, increasing productivity across domains while driving down overall cost.

Since 2006, the Warfare Enterprises have been tasked to look at the value of force training and readiness from a business perspective, focusing on the Total Ownership Cost (TOC) of the way the Navy does business (operations). This requires each level of command to first determine the potential Return on Investment (ROI) anticipated of a particular type of system or service to be acquired, rather than simply acquiring a system or service because it provides leading edge technological capabilities.
The Navy’s Enterprise construct serves as the foundation for developing metrics which are used to determine types of Navy training systems to be acquired. For the Navy’s training plan, it is no longer about a Revolution in Training – it’s about the costs and readiness of training.

### 1.1 Navy Organization Overview

Training and education plans, programs, and budgeting objectives are coordinated by senior Naval leadership and flow through the Shore Establishment to the Systems Commands and training organizations responsible for acquiring training resources, and managing basic and follow-on schoolhouse training. These objectives flow down to units and organizations responsible for training fleet Operating Forces, and coordinating fleet replacement and pre-deployment training for extended naval operations at sea. A high-level view of overall Navy organization, showing the senior Navy Leadership relationship with Resource Sponsors and Shore and Sea commands who make up the Major Claimants is presented below.

![Figure 1-1: Top Level Navy Organizational View](attachment:image.png)

Training requirements and master plans are prioritized and funded at the highest levels of Navy leadership on the Chief of Naval Operations\(^1\) (CNO) staff. This OPNAV Staff\(^1\) is made up of

\(^1\) The Navy website defines the CNO as “the principal naval advisor to the President and to the Secretary of the Navy on the conduct of war, and is the principal advisor and naval executive to the Secretary on the conduct of naval activities of the Department of the Navy. Assistant officers and their staffs are collectively known as the Office of the Chief of Naval Operations (OpNav)” [http://www.navy.mil/navydata/organization/org-top.asp](http://www.navy.mil/navydata/organization/org-top.asp).
five Deputy CNOs, collectively known as Resource Sponsors. These include the DCNO Manpower, Personnel, Education and Training (N1), DCNO Information Dominance (N2/N6), DCNO Operations, Plans, and Strategy (N3/N5), DCNO Fleet Readiness and Logistics (N4), and DCNO Integration of Capabilities and Resources (N8). Resource Sponsors on the OPNAV Staff provide planning and budgetary support to the Major Claimants. Major Claimants are commands in both Shore Establishment and Operating Forces, under the auspices of the Commander Fleet Forces Command (CFFC). CFFC is responsible for the readiness of all operational fleet units in the Navy.

1.2 Navy Organizations Responsible for Education and Training

There is no single organization responsible for overall Navy training programs, acquisition and related training issues; training requirement is spread across various commands. Major System Commands (SYSCOMs) are responsible for overall acquisition of Navy training systems. The Naval Education and Training Command (NETC) is responsible for officer accession training, the majority of enlisted training, and the management of numerous training centers located around the United States. The Naval Air Warfare Center Training Systems Division (NAWCTSD) is the major contracting agency for the majority of Navy training products and services.

Three major commands are responsible for Warfare pipeline training: the Chief of Naval Air Training (CNATRA); the Surface Warfare Officer School (SWOS); and the Submarine Learning Center (SLC). For the continuity of fleet aviation training initiatives, a brief description of activities conducted by the Naval Strike and Air Warfare Center (NSAWC) is also discussed.

1.2.1 Naval Systems Commands

The Navy’s Shore Establishment consists of organizations specifically tasked as providers of resources for all major warfare systems. These “Systems Commands” engineer, build, buy and maintain ships, submarines, aircraft, and combat systems that meet the operating Fleet’s current and future operational requirements. The five major Systems Commands are:

**Naval Air Systems Command (NAVAIR)—**develops, acquires and supports the aircraft and weapons systems of naval aviation. Within the NAVAIR organization, the Aircraft Division (NAWCAD) maintains a subordinate command which is a Training Systems Division (NAWCTSD) in Orlando, Florida. NAVAIR is the only Systems Command with a separate Training Division that serves specifically as a contracting agency for training products and services. Consequently, the other Systems Commands also use NAWCTSD as a contracting agency for training products and services.

**Naval Sea Systems Command (NAVSEA)—**the largest of the Navy’s five systems commands, it uses TSD Orlando to contract for training products and services required for both Surface Warfare and Undersea Warfare organizations.
Space and Naval Warfare Systems Command (SPAWAR)—an engineering and acquisition center for developing and delivering to the fleet networked command and control, communication and space systems and their intelligence products.

Naval Supply Systems Command (NAVSUP)—responsibilities include supply chain management, transportation, and warehousing. NAVSUP’s subordinate Fleet and Industrial Supply Centers (FISC) are often used for contracting training services.

Naval Facilities Engineering Command—responsible for public works, family housing and public utilities at Navy facilities throughout the world (NAVFAC).

1.2.2 Naval Education & Training Command (NETC)

Headquartered in Pensacola, FL, NETC is responsible for much of the training provided within the Navy as shown in the diagram below:
NETC\(^2\) is responsible for all Naval Service Training Commands for Recruit Training, Navy Reserve Officer Training Corps (NROTC) and Officer Training Corps (OTC) training. NETC is responsible for a number of Navy training programs including:

- Recruit Training
- Non-Naval Academy Officer Accession (NROTC and Officer Candidate School)
- Initial Skill Training (A Schools), Skill Progression Training, and Functional Skill Training
- Professional Development (Leadership Training Continuum and Navy College)

NETC also controls all Learning Centers, Training Support Centers and Training Activities shown above, as well as three other subordinate commands – Naval Education and Training Professional Development and Technology Center (NETPDTC), Naval Education and Training Security Assistance Field Activity (NETSAFA), and Defense Activity for Non-Traditional Education Support (DANTES) — see Figure 1-3.

Figure 1-3: NETC Training Centers

NETC is an Echelon 3 command reporting to the Chief of Naval Personnel, and employs a staff of approximately 11,800 military members and 3,000 civilians. It averages 33,900 students in training. NETC oversees 234 Activities, Detachments and Sites across the US.

\(^2\) All information provided on the NETC has been acquired through open sources available on the Internet. For more information, see [www.netc.navy.mil](http://www.netc.navy.mil).
1.2.3 **Chief of Naval Aviation Training (CNATRA)**

Headquartered in Corpus Christi, TX, CNATRA is responsible for training all Naval Aviators and Naval Flight Officers (NFOs) in the Naval Service, including the Marine Corps and Coast Guard. CNATRA is commanded by a one star Admiral (RADM) who reports to Commander, Naval Air Forces/Pacific (CNAF/P). See Figure 1-4 for an overview of CNATRA organization.

CNATRA is an Echelon 4 command that currently oversees five Training Air Wings and 17 flying squadrons. CNATRA directs multiple training programs that lead to designation as either a Naval Aviator (Pilot) or Naval Flight Officer (NFO). For many years CNATRA also provided interservice training for Air Force Undergraduate Military Flight Officers headed for flying assignments in B-1 and F-15E aircraft. This interservice training was recently terminated.

![CNATRA Organizational Overview](image)

While CNATRA is responsible for all Pilot and NFO training, the only role CNATRA plays in enlisted Aircrew training is tracking Aircrew and SAR swimmer training. In 2008, CNATRA shifted reporting senior from NETC to CNAF. In the current structure, CNATRA also serves as the Deputy CNAF for Training, code CNAF 00T. CNATRA is supported through the Naval Air Systems Command by PMA 273. This organization is responsible for procurement and support of all training command aircraft. CNATRA also plays a role in Task Group Accessions that deals with inputs to Navy force structure.

Key information provided by the CNATRA staff is summarized below.
• The Naval Aviation Production Plan is designed to reduce stash/wait time during flight training from commissioning source to the Fleet (including FRS). The goal of the plan is to gain control of whitespace (excess pools) in the training track. Previously, it took four years to get a student from the street to the Fleet. The NAPP is helping to reduce this by focusing on the demand pull to 1) identify how many 2) of what kind 3) in what month. The program is still relatively new, so no results were provided.

• Introductory Flight Screening (IFS) – This program allows aviation candidates to fly private aircraft for up to 15 hours of flight time to determine if the candidate can operate effectively in the aviation environment. While the program has not had an appreciable effect on attrition, it has been marginally successful at leveling the playing field for all new Student Naval Aviators (SNAs) and Student NFOs (SNFOs).

• CNATRA is taking over the Instrument Ground School instruction for the Navy and it’s going onto Navy Knowledge Online (NKO). This is a significant shift for a long-standing instructor led course to now be delivered online.

• CNATRA role in training UAS pilots is undefined.

1.2.4 Fleet Replacement Squadrons (FRS)

Following basic and advanced flight training coordinated by CNATRA, new aviators and flight officers are assigned to fleet aircraft squadrons based on current and projected needs of the Navy, the student’s performance, and preferences. New aviators and flight officers are selected for: Maritime (multi-engine prop), E-2/C-2, Rotary (helos), Strike (jets), and the E-6 TACAMO. New aviators and flight officers are sent from CNATRA to one of the various Fleet Replacement Squadrons (FRS) for specific aircraft training. The FRS locations are shown in Figure 1-5.

![Figure 1-5: Locations of Fleet Replacement Squadrons (FRS)](image-url)
1.2.5 **Fleet Weapons Schools**

After a naval aviator reaches a fleet squadron, ongoing tactics training is provided by each type aircraft wing. The training schoolhouses are known as weapons schools.

1.2.6 **The Naval Strike and Air Warfare Center (NSAWC)**

NSAWC at Naval Air Station Fallon is the primary authority on training and tactics development. It provides training, assessment, aviation requirements recommendations, research and development priorities for integrated strike warfare, maritime and overland air superiority, strike fighter employment, airborne battle management, Combat Search and Rescue, Close Air Support, and associated planning support systems. The command is also responsible for the development, implementation, and administration of several courses of instruction while functioning as the Navy point of contact for all issues relating to the Air Combat Training Continuum. Additionally, NSAWC is the Navy point of contact for all issues related to the Fallon Range Training Complex.

1.2.7 **Surface Warfare Officer School (SWOS)**

The Surface Warfare Officers School Command is the Center of Excellence for Surface Warfare. Funding for Surface Warfare training flows from a variety of sources, primarily OPNAV N86 and N1. N86 funding is typically resourced via NAVSEA while N1 funds SOWS directly as a Learning Center. The majority of these funds flow to NAWCTSD for execution.

SWOS recently changed many instructor positions from active duty instructors to civilian instructors (contractor and GS) to get longer term continuity. In addition, SWOS discontinued use of the Maritime Safety International (MSI – division of Flight Safety International) contract-
provided training centers and shifted 62 personnel from contractor to GS employees. These actions produced significant cost savings. As a comparison, it took $2.4M in 2004 to run MSI training as opposed to $1.6M in 2010 to run USG training.

NAWCTSD acts as the Program Manager for all SWOS training development programs. Generally, SWOS procures most of its requirement through the three IDIQ MACs at NAWCTSD. There are some Full and Open competitions awarded in support of SWOS along with Small Business Set-Aside, SBIR awards and single award IDIQ contracts.

1.2.8 Submarine Learning Center (SLC)

The SLC’s primary function is to partner with Fleet leaders to meet readiness requirements through performance. The SLC plans, programs, budgets, and executes individual and team training for Undersea Warfare Enterprise mission readiness. It develops, assigns, and coordinates future undersea warfare training and education solutions and allocates resources to execute undersea warfare training at Commander, Submarine Force’s fleet concentration areas.

The Center’s mission guides management of four major functions:

- Set policy for and execute performance of individual submarine training
- Determine and allocate resources necessary to support Learning Center and Site Functions
- Ensure Fleet Training Readiness supporting CSF mission accomplishment
- Create, coordinate, and execute future submarine shore training and education solutions for CSF requirements

Undersea Warfare Training is driven by the Undersea Warfare Training Committee. This committee serves as the collaborative voice for submarine training and looks at a Five Year
Defense Plan (FYDP) that runs through 2015. It controls about $2 billion in Navy infrastructure for submarines including approximately $800M at the SLC. The SLC trains over 1500 students per year. The submarine Fleet pays for the provided training and NETC handles the contracts.

SLC awards about $10M per year in COMS support (including computers, scalable trainers, computer re-hosts and problem resolution), $5M per year for combat control and sonar training devices and $3M per year for mariner skills training. The Learning Center uses several contracting options to procure their products and services including:

- NAWCTSD Orlando IDIQ MAC vehicles
- SBIR contracts
- NUWC Newport contract vehicles
- NAVSEA 07 contracts
- SUBTEC IPT contract vehicle

The submarine training community uses several advanced training systems to provide leading edge training for the crew members. The Submarine Multi Mission Team Trainer (SMMT) provides high fidelity training at all submarine FCAs, including a new facility in Guam. Submarine crews also use on board training systems where the training is accomplished with actual systems in training mode. Other training capabilities include electronic navigation training and casualty simulation and ordnance training including an escape trainer.

2.0 Market Description

The overall annual Federal budget has now reached $3 Trillion and the annual defense budgets generally range between 12-18% of that total. The recent defense budget was approximately $550B but with the continuation of the Global War on Terror (GWOT), the defense budget is approaching $660B. Open source Government projections show that Department of Defense (DOD) budgets should remain relatively constant during the next five years.

Of the $660B annual defense budget, it is estimated DOD training resources for all of the military services are approximately $35B each year. Estimates derived from annual briefings during NTSA’s industry symposiums, open source briefings and numerous market studies show that between $7-8B will be contracted to industry for training products and services each year for all of the military services.

2.1 Market Value (Budget)

The Navy share of the annual defense budget is approximately 25% of the overall defense budget. The Navy traditionally spends approximately 11-15% of its total funding or about $15B on training and training related activities. Most of this amount is spent on personnel training and training programs including acquisition of training aircraft, modernizing and maintaining fleet training equipment and devices, and delivery of education and training to more than 328,500 active duty and selected reserve personnel each year. Approximately $1.2B to $1.5B is contracted to industry annually to procure new training systems and devices, training services
and training center support, and for training content including curriculum and intellectual services. The figure below shows the flow of training dollars from the Resource Sponsors who determine the training requirements, to the major claimants who acquire new systems, manage existing systems and training facilities, and implement training programs.

![Flow of Navy Training Funds](image)

### 2.1.1 Procurement

NAVAIR and NAVSEA are the Major Claimants responsible for procuring training products and services for the Navy. The NAWCTSD in Orlando reports directly to the NAVAIR Aircraft Division in Patuxent River, MD. NAWCTSD is an Echelon 4 command which serves as the major contracting agency for procuring training devices, training services, and training curricula for the Navy. NAWCTSD reported approximately $863M awarded to industry in 2010 for products and services. They expect this total will reach $1B annually over the next five years. NAWCTSD Orlando’s annual training expenditures for each of the four major training product areas are shown in Figure 2-2.

![NAWCTSD 2010 training expenditures by major product area](image)

### 2.1.2 Naval Air Warfare Center Training Systems Division (NAWCTSD)

NAWCTSD is an acquisition command with a staff of approximately 1,000 personnel—of these, only about 50 are active duty professionals. Many in the civilian work force are part of a Government intern program that NAWCTSD is leveraging to meet their growing personnel demands. The organization has a presence in nearly every active U.S. Naval facility.
NAWCTSD controls about $1 billion per year in Total Obligation Authority (TOA). This is expected to increase through 2015 as major contract ceilings increase. Program Directors lead a majority of the projects, managing Training Systems development and modification, curriculum and content development, training services and intellectual services.

Training Programs at the NAVAIR Training Systems Division (TSD) in Orlando are aligned with traditional Navy organizations – Aviation, Surface Warfare, Undersea Warfare, Cross Warfare and International programs. The distribution of funding by NAWCTSD Program Director, shown in Figure 2-4, utilizes 2010 data.
2.1.2.1 Aviation Warfare Training

The Naval Aviation community procures and relies heavily on training devices, thus, the community invests heavily in and relies on modeling and simulation. Among many reasons for this, training devices present a significant savings in fuel cost and provide readiness while reducing wear and tear on the airframes, allowing aircrews to rehearse skills and missions in a non-austere environment.

The NAWCTSD Program Director for Aviation (PDA) assists in the management of all aviation training systems issues at NAWCTSD. The PDA is responsible for the execution of the largest Total Obligation Authority (TOA) of all NAWCTSD Program Directors, approximately $650M in 2010 – a total of about 70% of the overall NAWCTSD TOA. Of this funding, approximately $400M supports NAVAIR PMA 205 projects. PDA supports PMA 205 as primary teammate within the Naval Aviation Enterprise (NAE). While most of his staff is located at NAWCTSD in Orlando, his organization has representatives at NAVAIR Headquarters, NAS Patuxent River, MD, JSF JPO Crystal City, VA, and Wright Patterson AFB, OH.

2.1.2.2 Surface Warfare Training

The NAWCTSD Program Director for Surface Warfare Programs (PDS) controls roughly $52.7M in TOA annually to support 33 active programs in 2010. The NAWCTSD PDS assists with training that is not managed by NAWCTSD including on board and appended training devices like the Shipboard integrated combat systems, the Battle Force Tactical Trainer and stimulated OEM gear. The PDS also supports the Fleet with core clients at shore based surface training centers including:

- Schoolhouse learning centers
- Fleet training commands
- NETC N7 clients including SWOS, CNE, and CSCS
- Expeditionary Warfare Training Groups (EWTGs) -- These commands include LCACs, Naval Gun Fire Support (NGFS), Cargo offload and reservists and EWTGs Atlantic and Pacific Fleet Forces

Earlier this year, the NAWCTSD Program Director for Surface Warfare Programs (PDS) was designated the Littoral Combat Ship (LCS) Training Systems Agent Executive. Funding for full LCS training will be available beginning in FY-2012. Some training work is already in progress including: Virtual, immersive training technology; Virtual bridge; Readiness Control Officer (RCO); Tactical Action Officer (TAO); and Mission Package Watchstanders.

The LCS Learning Centers have been identified. The Center for Surface Combat Systems (CSCS) will serve as the LCS Training Lead. PMS 501 will be responsible for the Sea Frame related training and PMS 420 will be responsible for all Mission Package training.
2.1.2.3 Undersea Warfare Training

The NAWCTSD Program Director for Undersea Warfare Programs (PDU) controls between $25 and $30M annually to support 22 active projects in 2010. This value includes funding for internal efforts performed by the NAWCTSD staff. Most Funding for Undersea Warfare training programs flows from OPNAV N87 to NAVSEA 07TR for distribution.

PDU provides products to the SLCs around the Navy including the following training centers:

- New London where pipeline training is provided
- Trident Training Facilities at Kings Bay and Bangor
- Fleet Concentration Area (FCA) Learning Sites in Norfolk, San Diego, Pearl Harbor and Guam

In addition, NAWCTSD PDU also supports the Submarine On-Board Training (SOBT) office and several of the ROTC units across the country where the units are using the SUBSKILLSNET tool for navigation training. The PDU is not involved in nuclear power training.

NAVSEA 07TR has three major training providers – NAWCTSD, NSWC Carderock and NUWC Newport. In the Undersea training community, NETC sets requirements and pays for CBT classrooms and some individual trainers. NAWCTSD provides support to run training programs as directed by NAVSEA 07TR. The Undersea training community uses NAWCTSD contract vehicles including FTSS for COMS support and trainer modifications, NAVSEA vehicles and Seaport-e. NAWCTSD PDU uses these contracts to provide oversight of several training programs including:

- SUBSKILLSNET—used in Mini-Span, legacy Submarines Multi-mission Team Trainers, SOBT, and ROTC Units
- Common Submarine Radio Room Trainer and Submarine Communications Support Systems
- Multi-Reconfigurable Training System (MRTS) for Weapons Launch Control Team Trainer (PC-based, touch screen classroom; can change classroom to different configurations)

2.1.2.4 CROSS Warfare Training

The NAWCTSD Program Director for Cross Warfare Programs (PDX) controls roughly $75M in TOA annually to support 19 active programs and supports a long list of clients including:

- International Community
- Joint Forces Command (JFCOM)
- National Guard
- Northern Command (NORTHCOM)
- Commander, Navy Installations Command (CNIC)
- Shore Force Training Center – North Island
• Air Force (rapid scenario generation and weather modeling)
• PMW 240 (Sea Warrior – NETC)
• NETC school houses and home port training
• Federal Law Enforcement Training Center (FLETC)
• Department of Energy National Institute of Building Science (DOE NIBS – a Cooperative Research and Development Agency (CREDA))
• Weatherization and ‘green’ training for government buildings
• Special Operations Command (SOCOM) – all product lines including UASs
• Navy Special Warfare
• Naval Service Training Command (NSTC – part of NETC)
• NROTC – classroom installs for NETC

2.1.2.5 International Training

The NAWCTSD Program Director for International Programs (PDI) controls roughly $80.4M in TOA annually to support 26 active programs ranging in value from $100K to $45M. The NAWCTSD IDIQ MAC contracts are used for much of this work, while a significant portion of the international work is sole sourced to companies named in Foreign Military Sales (FMS) Letters of Request (LOR). International Program clients include:

• NAVAIR 1.4 International Program Office (IPO) policy and oversight
• Defense Security Cooperation Agency (DSCA)
• Navy IPO (country specific)
• NAVAIR PMAs – aircraft platform specific
• NAVSEA PMSs – surface ships platform specific
• NETSAFA – NETC manager for international programs

2.2 Training Product Lines or Training Priorities

The Navy total training system includes training center and range support, instructor services, curriculum and training content, training devices, intellectual services, and training products and services for foreign militaries. Devices range in capabilities from simple part task trainers – many playing on personal computers – to full motion aircraft simulators and include the following: Aircrew trainers; Operational Flight Trainers (OFTs); Weapon System Trainers (WSTs); Maintenance trainers; Shiphandling trainers; Tactics trainers; and, Engineering / Damage Control Trainers.

In the Surface Warfare community, training managers look to devices to provide a “Train to Qualify (TTQ)” capability that will allow new replacement crews to report to assigned ships with qualifications already awarded by the training schoolhouse. In addition, SWOS managers also look to simulators to provide a “Train to Certify” team training capability for watch teams. This concept is a foundational building block of the Littoral Combat Ship (LCS) training program.
2.2.1 Team Training

In the Navy training arena, particularly in Naval Aviation, most of the training is focused on developing individual skills; however, the future will likewise focus on team training. For example, experts in Undersea Warfare training have identified Combat System Team training as a priority.

There are potential applications of the Live Virtual Constructive training approach in supporting Battle Group staff training, pier side Fleet Exercises and other major staff training evolutions.

2.2.2 Naval Aviation Simulator Master Plan (NASMP)

The Naval Aviation Simulator Master Plan (NASMP) incorporates the science of learning into trainer requirements and maps operational requirements to simulator capabilities, specifically in an effort to drive a requirements pull rather than a technology push. For example, a trainer’s visual system should align with the fidelity requirements to support the training evolution, not provide the best possible visual system. A benefit of the NASMP is the application of normalized, consistent architecture across the plan.

2.2.3 Training Center Support and Instructor Services

Training center support includes a variety of training services including Contractor Operation and Maintenance of Simulators (COMS), Contract Instructor Services (CIS), and other training center and training range support activities.

COMS requires the Contractor to provide all labor, materials, consumables, equipment, tools and test equipment, and transportation necessary to maintain designated training systems and equipment in a fully operational condition. Tasks could include training device operations, maintenance, supply support, information assurance, technical data verification, access control, janitorial service, trainer modification support, and trainer space preparation. CIS requires the Contractor to provide Contract Instructors (CI) in support of simulators, training devices, associated classrooms and/or other training methods to train users in the knowledge and skills to support the mission and the established learning objectives. This service will normally include instruction, operation, and curriculum support requirements as required.

Training System Management (TSM) requires the Contractor to provide a program or system to include any and all necessary support to run and manage a training site. This may include those activities associated with training facilitation and student management activities such as: scheduling, administration, record keeping, and reporting. TSM may be turnkey level of support, typically performed at a centralized training site.

Training device relocation tasking requires the Contractor to relocate devices and associated equipment, including all associated Material Support Packages (MSPs). The Contractor would be responsible to provide experienced and qualified personnel, packing and shipping equipment and supplies, permits, and all other materials and resources to inspect, inventory, disassemble, package, ship, install, test, and restore the trainers and MSP to ready-for-training condition.
Training Device Modification (TDM) requires Contractors to accomplish quick turn-around changes or modifications made in compliance with Government issued Training Equipment Change Directives (TECD’s) or aircraft Technical Directives (TDs). TECD’s implement modification or engineering change requests or proposals related specifically to trainers, whereas TDs implement Air Frame Changes (AFC’s) or Avionics Changes (AVC’s) applicable to both aircraft and trainers. In response to Government solicitations for trainer changes/modifications, the Contractor should make effective use of on-site personnel in proposal development, and in the resulting modification work effort. Modifications will involve no or limited design/development work. The Contractor may be tasked to procure spare parts for new, newly-modified, or fielded training devices and/or equipment. The Government will provide the provisioning data to the Contractor, including screening parts for source and availability, ordering, packaging, shipping to the site(s), and configuration conformance of the logistical support packages. The Contractor acts as freight and shipping consolidator.

2.2.4 Training content and curricula

Training content and curricula includes traditional instructor led and self-paced courseware, training games, training labs and learning centers, and seminars. Intellectual services include Research and Development (R&D) and analysis services. The Navy’s use of Computer Based Training will be greatly influenced by the March 2009 Navy Inspector General Report on CBT. As a result of the IG report, new curriculum development efforts will now focus on the up front analysis that defines the training requirements. This applies to both new development and revision and maintenance of existing courses. This increased emphasis on requirements definition has led to a significant increase in the analysis workload and training managers anticipate that this increased focus will continue in the coming years.

2.2.4.1 Simulation

The Navy looks to the cost savings of simulation to provide the mechanism to maintain readiness while reducing operating funds. On average, simulators cost about 10% of the cost to operate the actual platform (aircraft, ship, weapon system) that the device is simulating. There are many high risk scenarios such as engine failure drills that can be safely trained in a simulator that would never be performed in the actual platform. Because of the increased capabilities of simulators to train Navy operators and technicians, the Navy is experiencing a significant increase in their use. This increase is expected to continue, even in an austere budget environment, to include increase in use of medical simulations and irregular warfare training.

2.2.4.2 Computer Based Training (CBT)

The IG’s report on CBT (2.2.4) analyzed of the impact of the Navy’s use of CBT in training started in early 2000. The report concluded that CBT can be effective when indicated by cogent instructional design criteria. It must conform to ILE guidance so it can effectively play in the Navy’s learning environment. Additionally, it needs to be used in a blended solution to maximize all learning styles as well as maintaining the human element as performed by an
instructor. Finally, life cycle maintenance to include costs need to be an integral part of planning.

Training managers anticipate a continued need for CBT that responds effectively to well-defined requirements identified in science-based analyses (e.g., Front End Analysis, Training Situation Analysis, Gap Analysis). CBT developers will need to bring a capability to conduct these analyses in order to provide a full spectrum offering in support of CBT requirements. CBT will continue to serve as a major portion of Navy training, but with changes to the delivery methods as recommended by the IG report, as well as new focus on increasing interaction of students with instructors, and capability for group or team training.

2.2.4.3 Gaming and Virtual Worlds

Today’s courseware now includes more than simple interactive delivery of information. Learners expect engaging content that involves them learning. Gaming solutions and virtual worlds provide that and significantly complement traditional CBT. Navy training managers are using this capability extensively in new training systems. For example, the LCS training approach leverages a great deal of virtual world and gaming technology in their proof of concept training systems. Training managers expect this trend to continue.

2.2.4.4 AIM development

The Navy owned Authoring Instructional Media (AIM) tool has recently been identified in NA VedTRA documents as a tool of choice for Navy training development. In the soon to be released NA VedTRA 136 (which will replace the ILE guidance documents), NETC states that AIM will be used for all content development within NETC commands.

2.2.4.5 Instructor Led Training (ILT)

ILT will continue to be a foundation of Navy training for the foreseeable future. Like CBT, all new ILT will be developed based on analytic identification of specific training requirements that can be effectively accomplished through ILT.

2.2.5 Intellectual Services

The Navy also procures intellectual services to support several training requirements including Research and Development (R&D), analysis tasks and work year support for NAWCTSD to provide manpower for other Navy organizations. Analysis related tasks in the training arena will be focused primarily on identifying and articulating training requirements (i.e., Front End Analysis, Requirements Analysis, and Media Selection Analysis).

The focus over the next five years will be on creating realistic acquisition plans and executable projects driven by Front End Analysis data and the science of learning. Tomorrow’s training systems will be developed based on detailed, science-based analysis of highly granular capabilities applied to the rigors of media selection process to identify the optimum, most cost effective training systems possible.
Not all training requires the highest fidelity or the latest technology. Training systems must align capabilities with requirements. Return on Investment (ROI) should be based on the training and readiness produced by the training system vice the technology push.

3.0 Goals & Challenges

Challenges will continue to be encountered as Naval components respond to increases in training demands concurrent to decreases in training resources, and subsequently, the goal will be to train to the maximum levels of effectiveness and efficiency possible. Obviously, challenges will be encountered based on financial constraints. For example, in Cross Warfare training, home port training (Mess Specialist, Barber school, other related training) is disappearing. NETC funding for homeport training was lost to budget shortfalls, consequently, Fleet commands will have to pay for homeport training.

Yet, even in the face of shrinking resources, training demands will grow, such as demand for technologically advanced training grows. Experts expect growth in simulation-based training – demand over next five years is likely growing.

3.1.1 Defining Training System Requirements

The future fiscal environment requires a focus on best value for defined Fleet capability, given limited investment dollars. To this end, experts call for a shift of focus from a technology push to a requirements pull paradigm in training definition, design, and delivery processes. Components seek improvements in the requirements definition process, particularly in new hardware (systems) acquisitions to allow training to get involved earlier in the process.

All training system managers must focus on requirements definition that leads to Fleet capabilities in the coming years. Training must be focused on the right type of training in the appropriate setting. Experts particularly point to schoolhouse training. Appropriate alignment of training tasks to training settings will necessitate more emphasis on effective requirements definition to include the ability to recommend right training solution at the right price and deliver the defined system. There should also be the capability to adapt to changing requirements and fleet priorities, with an emphasis on life cycle support and concurrency with tactical changes and a renewed emphasis on Total Ownership Costs (TOC).

3.1.2 Defining ROI

Defining the ROI for any given training system is a challenging task. While cost is often assumed to be the basis of ROI, a number of factors can be considered.

Cost Benefit Analysis (CBA) – This traditional assessment method identifies the cost for delivering any particular training and then attempts to dollarize the value of that training in the operational environment. While the cost of the training is readily apparent, assigning a value to the training received is virtually impossible without some sort of guidance.
Student Performance Analysis – This approach would again use the cost of delivering the training compared to the improved performance of the student as a result of receiving the training. This improved performance could be measured through a variety of means including traditional grade sheets, time to react or perform, quality of results, or other workable but consistent metrics. The challenge here will be normalizing the improved performance across a wide spectrum of students and a variety of performance metrics. By specific task and per individual this approach could provide a workable means to generate a training improvement ROI.

Impact on T&R Matrix – This approach would again use the cost of delivering the training compared to the very specific and measurable impact on the trainee’s increased value as a result of additional qualifications from the T&R matrix. The T&R matrix could be parsed out and values assigned for each of the required qualifications, then the cost of the training could be compared to the T&R value of the achieved qualification. The value of a training system could be measured against the total number of T&R related qualifications that could be achieved in the training device. This approach appears to have the most likelihood of successfully defining meaningful ROI figures for training and fiscal decision making, but will require significant Navy buy-in and participation to assign realistic values to T&R matrix qualifications and could require further manipulation of the T&R matrix to provide value for those building blocks that lead to a T&R qualification. Of course, there is also a need to factor in accessibility into the ROI metrics. For example, an online training course could be very accessible, but a full motion simulator would offer very limited accessibility. This characteristic needs to be factored into the ROI metrics.

3.1.3 Maintaining Concurrency

Across the training management landscape, concurrency of training devices is a hot button issue. Frequently, this is left out of budgets and planning documents, leaving commands to scramble for funding to keep their training devices current with the real world systems. This challenge is further exacerbated by today’s software driven systems that can change as much as quarterly with the issue of new software versions. In other cases, there are challenges determining how to best migrate modifications into the training devices.

At the Chief of Naval Air Training (CNATRA), concurrency is particularly critical as they are currently working through five different aircraft modifications to their training aircraft and all these modifications need to be incorporated into the training devices to provide effective training. Almost all of CNATRA’s top issues involve concurrency of training devices as the training command’s aircraft go through upgrades and modernization. In addition to the upgrades of the training aircraft, there is an inherent configuration management challenge to maintain concurrency in simulators as glass cockpits come into reality. As glass cockpit software changes, the training systems must change to maintain concurrency. In the next year two years, primary training aircraft will transition from T-34 to T-6B, strike training aircraft will transition from T-45A to the T-45C glass cockpit, rotary wing training helicopter will transition
from TH-57B (VFR only) and TH-57C (IFR capable) to the TH-57D glass cockpit, and multi-engine training aircraft will transition from T-44A to T-44C glass cockpit.

The submarine training community also has a constant challenge supporting concurrent training because of the number of software variants in use onboard submarines at any given time. As a result, there is no way for any single software variant to provide concurrent training to all submarine crews. This generates an inherent lag between shipboard and training equipment. The SLC is currently operating with a ten year plan for concurrency matching and they have deputized each training center commander to form a committee to track concurrency issues. Determining the correct configuration for a training device that supports all variants of software becomes problematic. This leads training managers to look to industry to develop reconfigurable training devices that can accommodate multiple variants of systems on the same training hardware.

3.1.4 Ensuring Quality

Ensuring the quality of training event requires controlling multiple variables. For SWOS, all training is local, so the outcome of any training event depends on the attitude of each class, the quality of the instructor, and the specific environment of the class. SWOS faces significant challenges in ensuring training quality.

3.1.5 Establishing Appropriate Training Standards

Different programs require/desire varying levels of achievement in training. SWOS is replacing familiarization training with proficiency training and working toward Virtual Environment “Train to Qualify” (T2Q) using physics based training devices. The current goal is to get T2Q to 85% for Engineering Officer of the Watch (EOOW) qualifications and 65% for Tactical Action Officer (TAO) qualifications. Eventually, SWOS envisions achieving 100% qualifications in training devices using high fidelity virtual environment and gaming technologies. Surface Warfare training seeks to provide the capability to “Train to Certify” for watch team training and field a high fidelity, low cost training system to support individual “Train to Qualify”.

3.1.6 Enabling Individual, Unit, and/or Team Training

In the Navy training arena, particularly in Naval Aviation, most of the training is focused on developing individual skills. Training systems managers need to improve unit and force level training systems. The primary focus to date in Naval Aviation, particularly in the simulation arena, has been on developing individual skills. This focus needs to expand to identify ways to use simulation technology to bring that training capability to a larger audience to include training in communication at Force level, training to coordinate information, and decision-making skills.

There are potential applications of the Live, Virtual, Constructive (LVC) Training approach supporting Battle Group staff training, pier side Fleet Exercises and other major staff training evolutions. One of the challenges with this LVC approach is the time required to set up and align communications, then aligning all the participants. While Virtual training may be able to
offset some of this dead time, the turnkey capability of LVC training in the Navy still has significant challenges.

3.1.7 **Incorporating New Technologies**

Many training components are attempting to incorporate leading edge technology improvements to their training systems. SWOS in particular seeks to:

- Implement Intelligent Tutoring System (ITS), reducing instructor necessity
- Execute physics-based CBT and desktop simulations with button smashing capability
- Reduce reliance on Technical Training Equipment (TTE), replacing TTE with simulations
- Develop an adaptive learning program using Sandbox technology
- Measure trainee load/overload as part of LCS Readiness Control Officer (RCO) training, by attempting to use brain wave measurements

3.1.8 **Balancing Fidelity and Effectiveness**

Many training challenges are about incorporating the appropriate level of fidelity in training devices to achieve maximum training effectiveness. Accordingly, the challenge is to define the training requirement and build the training system with the appropriate level of fidelity to meet that training requirement. Training managers seek modularized training devices to provide the right training in the right venue and leverage existing training devices to meet their current and future training requirements. While this will continue to be a factor, some training managers suggest that affordability should not be a driving factor in the development process – industry’s top priority should continue to be meeting training requirements with effective training systems.

3.1.9 **Designing Scalable Training Systems**

Training systems should be designed to support a variety of learner sets (e.g., single or team learning, portable or fixed location) to optimize the functionality of the training system, yet must maintain capabilities. The Surface Warfare training community, in particular, seeks a scalable training continuum that allows training systems to meet a variety of objectives.

3.1.10 **Networking Training Systems and Devices**

The capability to support more than individual training will require improved networking of training systems. Tomorrow’s aviator will likely conduct major portions of their training in interoperable simulators linked by elaborate, secure networks that allow virtually every mission to be flown in the simulator – up to and including coordinated joint exercises with multiple participants. Networking must support Joint Level interoperability, be affordable and persistent, and provide the correct level of fidelity for tasks.

In order to make any distributed training effective, the participating systems must share only configuration controlled certified data. This data must accurately represent the system capabilities and be appropriately protected at the required security level of the participating
training systems (e.g. network security and Critical Information Protection (CIP)). This final piece, CIP, is particularly critical because the training systems contain accurate models of operational capabilities, systems performance and other critical data. The challenge is to determine how to protect sensitive information while sharing the required data to support effective training.

Another security challenge is providing multi-level security, particularly when operating distributed networked training devices with foreign forces. The variety of access levels makes this a demanding problem. Networking of trainers has significant potential in the international arena, but there must be established NATO standards that apply to all participants to make this capability a reality.

3.1.11 Other Industry Challenges

The M&S community needs a dedicated NAICS code to accommodate the myriad M&S requirements.

The convoluted nature of international policies and regulations make international sales a daunting task. ITAR compliance falls to industry. Industry is responsible for all ITAR and release-ability requirements and export licenses.

The future training environment will have multiple generations using the advanced training technology at the same time. This will also involve concepts of virtual worlds and virtual environments as well as the use of new technologies such as IPADs and IPHONEs for training. Accommodating learning styles of generational groups may require significant industry effort.

One challenge with virtual gaming technology will be developing the programming techniques to simulate tactical software code. The Navy’s preference is to avoid the use of real world tactical code because that approach frequently impedes progress and induces integration challenges. Simulating real world code provides the same benefits without the integration challenges, but will require life cycle support to keep the simulated systems current.

4.0 Organizational Acquisition Strategies

According to senior Navy training managers, industry should expect the Navy to continue the use of pre-approved suppliers to provide products and services using vehicles like TSC III, FTSS III and ISDC. The Navy is interested in building long term relationships with their industry support partners and the Navy recognized the value of the team approach as the best approach to accomplishing our collective training objectives.

4.1 Major Contract Vehicles Used for Training

The Navy has contract vehicles in place that provide the necessary avenue to support virtually all the lines of service required for Navy training worldwide. Examples of these are listed below:

- NAWCTSD Training Systems Contract III (TSC III)
- NAWCTSD Fielded Training System Support III (FTSS III)
- NAWCTSD Instructional Systems Design Contract (ISDC)
- NAWCTSD Research and Development Contracts
- NAVSEA training contracts
- NAVSUP (FISC) training contracts
- NETC training contracts
- Seaport-Enhanced (SeaPort-e) services contract
- Direct award contracts for international training
- Training procurements through total Contractor Logistics Support (CLS) contracts

**Training Systems Contract III** – TSC III is a follow on to the very successful TSC II Lot I and TSC 2000 Lot I. TSC III contract vehicle is anticipated to have a ceiling of $2B and a cumulative ordering period, including options of seven years. This series of contract vehicles is used to procure training systems to include, but not limited to:

- Aircrew trainers
- Operational Flight Trainers (OFTs)
- Weapon System Trainers (WSTs)
- Maintenance trainers
- Shiphandling trainers
- Tactics trainers
- Engineering / Damage Control Trainer

**Fielded Training Systems Support** – FTSS III is a follow on to FTSS I and II. The FTSS III contract vehicle will possess a cumulative ceiling of $980M and a cumulative ordering period, including options, of eight years. This series of vehicles is used to procure training services including, but not limited to:

- Operation and Maintenance services (COMS)
- Instructor services
- Full spectrum services

**Instructional Systems Design Contract (ISDC)** is a follow on to TSC II Lot II and TSC 2000 Lot II and is anticipated to possess a ceiling of $650M and an ordering period, inclusive of options, of eight years. This series of contract vehicles is used to procure courseware and content development and analyses to include:

- Courseware Development
- Curriculum
  - New development
  - Updates
- Analysis
Training 2015  
Navy

- Front End Analysis
- Requirements Analysis
- Media Selection

Training Systems (devices - as shown in the upper left corner of Figure 4-1, next page) may be accommodated by the TSC III multiple award contract vehicle. In-Scope Training Services (lower left) will be acquired by the FTSS III contract vehicle, and In-Scope Training Content and Curricula (upper right) and In-Scope Intellectual Services may be accommodated by the ISDC multiple award contract.

Portions of the Intellectual Services (Analysis) can also be acquired through the ISDC contract vehicle as it pertains to Content and Curricula.

Figure 4-1: Naval Air Warfare Center Product Line Summary

The focus of these IDIQ MACs is to make vehicles available to TSD Program Managers, PMA-205 and others to be able to rapidly meet Fleet requirements. Within the MACs, the Navy is focusing on how to streamline the acquisition process from the initial identification of a requirement to the award of a Delivery Order (DO). The Navy expects to streamline DO
proposal requirements only those proposal elements necessary to discriminate offers from one another so as to select the best value offer for each particular requirement. One new change to the upcoming series of IDIQs (TSC III, FTSS III and ISDC) will contain provisions permitting the government to reopen the competition at any time during the life of the vehicles to bring on additional contractors after initial award. This approach is intended to sustain the competitive base, including that of Small Business, of each of the MACs. All three of these new IDIQ vehicles will have the ability to bring on additional competition.

Every acquisition under all NAWCTSD contracts is reviewed and controlled by an Integrated Product Team (IPT) that consists of Program Directors, acquisition professionals and Small Business Advocates. These IPTs determine if each planned acquisition should go through one of the MACs or they should go outside the big three MACs for either Full and Open competition or via a Small Business Set Aside, or another socio-economic contracting approach, or acquisition through an alternative means. The work may be assigned to one of the three IDIQ MACs. In some instances, however, the IPT may determine that the acquisition strategy requires an acquisition strategy beyond the three IDIQ MACs.

**NAWCTSD Research and Development Contracts** – NAWCTSD uses Research and Development IDIQs to accomplish much of the intellectual services work including:

- Experimentation and studies
- Prototypes
- Small Business Innovation Research (SBIR)
- Protection of human subjects

These contracts may be awarded as standalone contracts to support specific research requirements. In addition to the IDIQ MACs and the R&D contracts, NAWCTSD also awards contracts through Full and Open competition, Small Business and 8A set asides, SDVOSBs and Hubzones.

**Naval Sea Systems Command (NAVSEA) Training Contracts** – NAVSEA manages a distributed laboratory construct that includes 10 facilities called Naval Surface Warfare Centers (NSWC) and Naval Undersea Warfare Centers (NUWC). The facilities provide engineering support to various NAVSEA acquisition projects, the fleets and other customers. NSWC, Carderock, MD and NUWC, Newport will often award contracts that may include a training component. Most of these contracts are focused toward logistics and operational support, but include a training requirement as part of the overall support requirement.

**Navy Supply Systems Command (NAVSUP) Training Contracts** – Located at many Fleet Concentration Areas around the country, the Fleet and Industrial Supply Centers (FISCs) award multiple award contracts such as the NEPDT contract described below, or single award contracts to support Navy training requirements.
FISC contract vehicles have also been used traditionally for large “instructor services” types of contracts for “classroom instructors” in support of NETC school houses and Learning Centers, and numerous international training programs.

NETC Training Contract – The Naval Education and Training Professional Development and Technology Center (NETPDT) is a subordinate command of NETC, headquartered at Saufley Field in Pensacola, FL. NETPDT has its own training support IDIQ MAC vehicle that was awarded through FISC Philadelphia. This contract vehicle is used specifically to support NETC requirements with a ceiling valued at $50M. Other commands including CNATRA also use this vehicle.

The Seaport-e IDIQ MAC – Seaport-e is a Navy-wide service focused contract vehicle that is available to all Navy commands. The vehicle is divided up by regions and by areas of expertise and has over 500 eligible providers. Because the vehicle is used to provide almost exclusively services, there is very little training focused work funneled through this vehicle. The Navy has used Seaport-e for range contracts like SCORE and NAS Patuxent River. There are two specific training requirements that are anticipated to be fulfilled through the Seaport-e contract – workforce support at NAWCTSD and In Service Engineering Office (ISEO) support services at various Navy training sites. Seaport awards are approximately $6B to $7B annually for contractor services. The major systems commands (NAVAIR, NAVSEA, SPAWAR, NAVSUP, and NAVFAC) are the primary contract awarding agencies.

Direct Award to International Clients – Many international clients elect to direct specific contractors to fill their training requirements by identifying those providers in the Letter of Request. It is perfectly acceptable for industry to work directly with international clients and bring that international client to NAWCTSD for a directed FMS sale. In those FMS cases where there is no directed contractor, TSD will determine the acquisition strategy.

Training Procurements through total Contractor Logistics Support (CLS) Contracts – The Systems Commands (NAVAIR and NAVSEA in particular) will often procure major weapons systems that include a Contractor Logistics Support (CLS) element whereby the Prime contractor not only builds the new weapon system, but also is contracted to provide the entire logistics support package including all engineering support, training devices, learning facilities, curriculum and courseware, as well as training center maintenance and operation, and instructor services. Examples of these types of procurements include the F-35 Joint Strike Fighter, the P-8 Maritime Patrol Aircraft, and all new nuclear powered aircraft carriers and submarines. In these types of procurements, very large teams are usually assembled to adequately satisfy the contract requirements.

4.2 Projected Future Acquisition Strategies

Nearly all training managers interviewed identified requirements definition as a critical component of any future training system. Training managers expressed that requirements must
be supported by science based analyses to identify the specific training requirement and preclude vague or poorly articulated requirements. Requirements must be documented and driven from the Training and Readiness matrix or the Training Requirements Document (TRD).

The analysis process must identify the optimum delivery media (courseware, desktop simulator, part task training device, OFT, etc.) and the fidelity requirements for that delivery media. In many cases analyses will be conducted internally by NAWCTSD ISD professionals. As a general rule, industry will likely be asked to validate the assumptions of the Government conducted FEAs prior to beginning any work.

### 4.2.1 Requirements Definition

Training system managers must put more emphasis on Front End Analysis (FEA) and requirements definition. At NAWCTSD, training system managers use the Systematic Team Assessment of Readiness Training (START) process and the NASMP to articulate requirements and link resources to requirements. The START process assigns relative value in training system decision making to assist in requirements definition. Once requirements are articulated, Fleet buy-in remains a critical component along with NAVAIR 4.2 cost estimates to meet requirements. START process has been kept in house at NAWCTSD and has not yet been shared with industry.

Program Directors face challenges in understanding, validating and defending Fleet requirements. All future training systems will need to better define the ROI for training systems. During the interview process several senior training managers discussed the shift to a new focus on the ROI anticipated with any new training product or service as it relates to the Training and Readiness (T&R) matrices of the individuals or units to be trainers. As an example, one training manager identified the fact that virtual world technologies like gaming are all good – but what is the delta between these new concepts and the real value of the training? Or, put another way, what’s in it for the guy to be trained? What’s the proficiency improvement? ROI analysis will be essential as industry brings new training systems and concepts to Navy clients. The goal is to optimize readiness over cost, where cost is expressed as the Total Ownership Costs (TOC) – not just the procurement cost.

To assist Program Directors in making values based decisions, industry can help to define training system ROI, and put a dollar figure into ROI metrics. This will assist in answering how much training to invest how to assess training effectiveness, providing measurable data from trainers as part of this review.

### 4.2.2 Acquisition Process

Naval component representatives seek greater expediency in the acquisition process. The average time to contract award is two years. Training managers want to adapt a level of risk method to accelerate this process. The acquisition and industry team needs to accelerate the process to get to award in less than two years and deliver in less than two years. Training
managers acknowledge this may require the Government to accept additional risks to procure training devices more quickly.

One option is to adapt a “level of risk” method that would allow training managers to accept more risk to get started quickly. This would necessitate a Government/Industry partnership with a high level of understanding of the training requirements and a firm expectation alignment at the beginning of the project. If the customer is willing to take more risk to get started quickly, a training system manager should have the latitude to generate a contract with a company that has a high level of understanding of the requirements.

Training managers specifically point to time issues in regards to simulation training devices. They assert that the timeline to build a flight simulator is too long. The planning stage to Ready for Training (RFT) is typically 3 to 5 years, but they desire that reduced to 18 months.

5.0 Market Trends and Technological Initiatives

Navy training managers have identified several leading edge concepts and technologies that will likely gain interest in Navy training circles in the coming years.

Adaptive Learning programs will adjust the training scenarios in real time to challenge the student or team of students, increasing or decreasing the level of difficulty to support growth of a learner or team. One program being developed at the Office of Naval Research (ONR) collects real-time performance feedback from learners, including physiological measurements to measure the trainee load or overload. This feedback is then used to identify trainee performance deficiencies and change scenarios to allow retest and correction during a single training mission. This technology is currently focused at Commanding Office decision making training.

Current training systems provide many metrics to grade success and ability to “stay in the box.” Trainers need to define how these metrics can help identify problems, change behaviors and help quantify what is not known.

The Navy identified a desire for a flexible, adaptable, linear programming capability to support executive decision making under different scenarios. This training would require the learner to sort out the most important choices and could include some artificial intelligence that automatically sorts decision options and may even following embedded programming rules to remove some of the bad choices. The goal is to develop a system that will deliver clear, consistent information to present the best choices or options while also only providing viable options. These choices would be based on an individual executive’s priorities or could allow input from a large community of current and past executives.

The mobile device, the IPAD, the IPHONE – all these new technologies provide advanced capabilities for delivering training and electronic performance support. The next generation of these devices will need to allow users to highlight and add notes to manuals, track personnel and coordinate efforts from various locations on the ship.
The next generation of high fidelity games will provide increases in capabilities. The next generation of games should be fully immersive and must assault the senses. Next generation gaming systems for training should include multi-player games that can accommodate teams of shipmates or squadrons, avatars performing guided steps or operating independently based on established rules, crews working together from remote locations on a virtual ship, all focused toward building better situational awareness. Wherever possible, these games should remove the negative training elements such as simulator sickness. The ultimate goal will be the ability to provide a full virtual environment to accommodate large scale exercises such as a Joint Fleet Training Exercise – all accomplished pier side.

The ONR has done some impressive work in Intelligent Tutoring Systems (ITS), which has helped reduce instructor workload at SWOS. Embedded training systems will continue to be an important part of Navy training. In fact, it appears that most new weapons systems will include some form of embedded training, with the LCS as a recent exception to this generalization.

Voice recognition and artificial intelligence continue to offer interesting training applications, but have yet to be fully developed to make a significant contribution to training systems.

5.1.1 Networking and Securing Capabilities

The Navy identified networked trainers as a key requirement in future training systems. Networking capability exists in many simulators, but frequently the capability is cumbersome to set up and difficult to use, particularly when participants are not collocated. In addition, the speed is not yet available to support the requirements for real time simulation across distributed networks. There are work-arounds, but they do not currently support full, real time simulations. The ability to easily and seamlessly link multiple training devices into the same training scenario will greatly enhance the quality and effectiveness of the training.

An equally important requirement for networking training devices is the ability to provide effective security for those networked training devices to ensure that only configuration controlled, certified data is used for distributed training. The Government needs industry’s help to determine how to effectively protect critical information embedded in simulators. This Critical Information Protection (CIP) requires real world answers before fully networked simulation will operate seamlessly and safely.

Effective networking of simulators will require a common architecture and industry wide standards. Over the years, the High Level Architecture has provided the foundation for this standard, but going forward these standards will need to expand to accommodate new capabilities and new participants. The NASMP needs normalized, consistent architecture and a well articulated business case to justify the investment in the NASMP.

The security systems of tomorrow will need to accommodate new trainer capabilities and new participants and provide appropriate levels of access to each of the multiple participants while ensuring the security of critical information.
5.1.2 Reconfiguration Capability

In support of the concurrency issue, reconfigurable training systems could help mitigate the concurrency issue by offering multiple variants of training on the same training hardware by simply loading up a different simulation. This approach would allow focused, concurrent training for multiple crews operating a variety of system software versions. In some cases this could include reconfigurable PC-based classrooms that could change operating software to accommodate a variety of real world systems in the same classroom.

The capability to easily upgrade a training device is another natural follow on to the concurrency requirement. As with reconfigurable trainers, an upgradable trainer will provide training managers with a relatively quick and inexpensive capability to keep the training device concurrent with the actual platform.

5.1.3 Scalability

Scalability will provide the ability to optimize the use of training devices to meet varying needs of the Fleet. Training managers envision training devices that will support a wide range of learner groups from single learner to a group of learners up to an entire watch standing team using networked training devices to support the multiple participant training requirements.

5.1.4 Deploy-ability

Training managers noted that deployable training devices would be beneficial along with forward fielding of deployable trainers. Other comments included the need to bring the training closer to the war fighters in self contained packages.

5.1.5 Reliability

Reliability of the training devices is particularly critical to support their high demand. In particular, CNATRA has an incredibly high demand for time on their training devices, so reliability is one of their most critical issues.

5.2 Opportunities & High Priority Needs

Cross Warfare training seeks to implement web-based, virtual reality training with fully developed roles for advanced training capabilities (gaming VR, etc), and improve and expand the use of commercial technologies like IPADS and IPHONES. Commercial technologies like PDAs are already being used on battle stations. These technologies would allow users to highlight and add notes to manuals, track officers or instructors, coordinate efforts on ships.

Cross Warfare training also seeks distributed, networked simulators that provide joint operational capabilities on a day-to-day basis without elaborate coordination to make it happen.

Undersea training seeks programming tools to develop graphics and logic providing more interactive display technologies and more three dimensional graphics and to support multi-users on the same touch screen.
In recent years, the CNATRA Undergraduate Military Flight Officer (UMFO) program has completed a comprehensive Front End Analysis to define the optimum training system to meet UMFO training requirements. Implementing the results of the FEA will involve the implementation of new training systems and syllabi.

A tool called the Training Requirements Analysis Tool (TRAT) was previously used by CNATRA to identify training requirements from the most basic aviation skills up to and including advanced skills used in the fleet and to determine the best place to teach those skills. It is no longer in use. CNATRA identified that they need assistance identifying where best to train various skills (classroom, CBT, OFT, part task trainer, etc.).

The Littoral Combat Ship (LCS) manning plan uses a manning model similar to the Blue and Gold crew approach used on ballistic missile submarines. In this case, four LCS crews will be assigned to three ships and the crews will swap every 117 days. There will be virtually no onboard training on the ship, so all training must be accomplished ashore. Crews will be required to maintain proficiency and combat edge while not at sea. As a result, the training system to support the LCS crews will require an “LCS University” similar to the Trident Training Facilities that support SSBN training. This LCS University will need to provide stem to stern training on all systems onboard the LCS to keep crews current.

The proposed LCS training approach will heavily leverage gaming and virtual immersion technology to help crews maintain their proficiency while ashore. The intent is to develop a training system that will support a “Train to Qualify” capability within the training system. This will allow crews to maintain readiness while not at sea. The LCS training system will also implement an Intelligent Tutoring System (ITS) to assist in tracking crewmember progress and optimize individual and team training events.

SWOS currently uses an auto evaluation tool in their Shiphandling training and would like a similar capability in other training systems. SWOS and industry partners need to develop a way to train how to “self assess” a ship in a virtual environment. This is an ongoing challenge in the Surface Warfare community and requires increased focus to better meet this training requirement. The training system not only needs to train how to effectively self-assess but also needs to validate the learner’s ability to self assess, not just have knowledge or recognition.

SWOS seeks high fidelity gaming that provides leading edge multi-player, team, and avatar-based training that provides learn stations and awareness training, as well as the capability to train together on a single virtual ship. Game-based training should display potential problems for trainees to recognize and the play the game of working the ship as a team. This may require new programming techniques to simulate tactical code, as use of the actual platform code should be avoided.

SLC seeks adaptive learning scenarios, including a flexible, adaptable, linear programming capability to support executive decision making under different scenarios. The SLC would like to see an increase in the use of modularized training to provide the right training in the right
venue and leverage SUBSKILLSNET. This approach would likely reduce the cost of training system procurement and life cycle support.

6.0 Outlook/Summary

The training community needs to better define standards and align expectations between U.S. Government and industry. This requires frequent communications in a collaborative IPT environment. Future training systems must respond to clearly articulated, well defined training requirements and provide measurable return on investment metrics to win Navy training managers’ support.

Total Ownership Cost (TOC) is the new focus for Navy training managers, which drives their commitment to meeting the well defined requirements with effective training systems.

It is likely that the Navy will no longer be able to afford full scale operations to maintain readiness, which could then dictate a requirement for increased capability in the simulators. The CNO sees Modeling & Simulation (M&S) as a possible mechanism to fill the readiness gap. Better M&S could help maintain readiness while cutting back operating dollars. Anticipating that the Navy will no longer be able to afford flight hours, which could then dictate a requirement for increased capability in the simulators, Industry will need to assist the Navy to make the business case for additional training capabilities already identified in the NASMP. Industry would be well served to help make the business case for additional training capabilities.

If the Government / Industry team is able to make interoperability of trainers a day-to-day reality, supported by well defined requirements and providing reasonable ROI metrics, there is a very real chance that we could see an increase in M&S funding in the face of budget decreases to maintain readiness.

7.0 Sources


7.1 Personnel Interviews

Augustin, Walter. Technical Director, NAWCTSD. Personal Interview. 2010, June 08.

Broderick, Tom, Captain. Prospective Chief of Staff (COS), Commander Naval Aviation Training (CNATRA). Personal Interview. 2010, June 03.
Crabbe, James A. “Buster”, Captain. Chief of Staff, CNATRA. Personal Interview. 2010, June 03.

Delicati, Tony. Director of Contracts, NAWCTSD. Personal Interview. 2010, June 08.

Dowd, Tim. Director of Contracts, SPAWAR. Personal Interview. 2010, August 05.

Durgan, Dave, CDR. N38 Requirements Officer, CNATRA. Personal Interview. 2010, June 03.

Freeman, John. Program Director, Surface Warfare Programs (PDS), NAWCTSD. Personal Interviews. Newport, RI. 2010, May 11 and Orlando, FL. 2010, June 08.

Grimland, Dave, Captain. Program Director, Cross Warfare Programs (PDX), NAWCTSD. Personal Interview. Orlando, FL. 2010, June 08.

Honold, Paul. Program Director, Undersea Warfare Programs (PDU), NAWCTSD. Personal Interview. Orlando, FL. 2010, June 08.

Hooper, James M. Deputy Assistant to the COS for Training, CNATRA. Personal Interview. 2010, June 03.


Merkel, Wilfred. Simulator Requirements Officer, CNATRA. Personal Interview. 2010, June 03.

Merritt, Mike. Program Director, Aviation, NAWCTSD. Personal Interview. Orlando, FL. 2010, June 08.


Reuter, Bill “Roto”, Captain. Commanding Officer, NAWCTSD. Personal Interview. 2010, June 08.


Whitaker, Dale. Program Director, International Programs, NAWCTSD. Personal Interview. Orlando, FL. 2010, June 08.