

THE STAN DATABASE

By Bob Zanella

Today's topside design and electromagnetic compatibility (EMC) engineers are presented with some very difficult challenges aboard U.S. Navy (USN) ships. Throughout the years, the number of topside antennas aboard USN ships has grown, even though the topside space available has not. Antennas are not only located on the topside of ships, but below decks as well for such things as damage control communications. In addition, the shipboard systems that are connected to these antennas emit signals, sometimes unintentionally, that may be in an adjacent or overlapping frequency band with neighboring systems. Finally, the duty cycles of shipboard radars, which is the ratio between the transmit pulse width and pulse repetition interval (PRI), continue to increase and stress the interference rejection capabilities of shipboard receivers. Both ownship and offboard emissions—from other ships or shore-based infrastructure—create a unique and stressing operational electromagnetic environment (EME) for shipboard systems. Due to this EME, interactions occur between systems that degrade their operational effectiveness and performance, which could put the ship and its crew in danger. These interactions are considered electromagnetic interference (EMI).

The Shipboard Electromagnetic Compatibility Improvement Program (SEMCIIP) was created by the Naval Sea Systems Command (NAVSEA) to combat EMI problems aboard surface ships and submarines. The primary tool used by SEMCIIP is

the SEMCIP Technical Assistance Network (STAN) database, which is managed by the Naval Surface Warfare Center, Dahlgren Division (NSWCDD), Electromagnetic Environmental Effects (E3) Force Level Interoperability Branch. STAN is the Navy's official repository for EMI control and radiation hazard (RADHAZ) data for systems, ships, submarines, and strike groups. Figure 1 shows the STAN home page.

STAN is a web-based application that currently serves over 700 users. It contains data on over 1,100 EMI problems that have been observed over the past several decades. The user base for STAN consists of military, government civilian, and contractor representatives, who requested an account free of charge. Military users include personnel from the fleet, regional maintenance centers (RMCs), the Board of Inspection and Survey (INSURV), and various commands. Government civilian and contractor users include engineers, technicians, and managers who support the fleet from system commands, warfare and system centers, RMCs, shipyards, program executive offices (PEOs), and various others.

STAN provides several products that are used on a daily basis. Primary products include EMI brief sheets and their associated affected ships list,

EMI test procedure, tailored ship equipment lists, and a vast E3 document library. Additional products are available in STAN, such as EMI problem listings by selected criteria, electromagnetic (EM) control drawings, and the Ship EMC Certification test plan generator, to name a few. This article, however, will focus on STAN's primary products.

ELECTROMAGNETIC INTERFERENCE (EMI) BRIEF SHEET

The EMI brief sheet is the most important product provided by STAN. A brief sheet is created for every unique EMI problem that is observed in the fleet. Each problem is assigned a number called a SEMCIP Problem Number (SPN). The EMI brief sheet includes the source and victim systems involved, the problem category (based on the severity of the problem), the problem status (whether the problem is being worked or is resolved), and the SEMCIP engineer assigned to solve the problem. The body of the brief sheet consists of a description of the problem; its operational impact; recognition symptoms; and the fix identification description (ID) and status fields. For example, Figure 2 is the EMI brief sheet for SPN 1-07.

The EMI brief sheet's problem description section provides an overview of what the problem is

NAVSEA
NAVAL SEA SYSTEMS COMMAND

Welcome: rzanella

HOME > STAN System

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4/17/2008 - Search Engine

Welcome to STAN

SHIPBOARD ELECTROMAGNETIC COMPATIBILITY IMPROVEMENT PROGRAM
A NAVSEA PROGRAM
SEMCIP

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- System Notices
- External Links Policy
- DOD Disclaimer

• Click here to update your personal information and password.

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• Click here to view helpful hints for the New STAN site.

This is an Official U.S. Navy Web Site
This information resides on a DOD interest computer. Important conditions, restrictions, and disclaimers apply.
This site has been accessed **121563** times since November 2000.

My Top 5 Links

Users Online
MBOWLER

Figure 1. STAN Homepage

Problem Number 1-07	Suffix HA	Problem Status RESOLVED	Coupling Path ANTENNA TO CASE/CABLE	Revision Date 1/15/2009
Source AN/SPS-40		Victim B&A CRANE		Modifier SPS-40 MAIN BEAM
Problem Solver		Activity		Phone

Problem Description

Description:
The following ship classes have the source/victim pair installed: LPD 4.

The AN/SPS-40 causes electromagnetic interference (EMI) to the boat and aircraft (B&A) crane. The AN/SPS-40 severely impacts the operation of the crane by affecting the electrical input signals to the Rexroth hydraulic proportional directional valves. This causes their hydraulic outputs to shake the crane boom each time the AN/SPS-40 antenna points towards the cab of the crane.

LPD 4 Class - (Cat 1) Severe interference has been observed aboard USS *Ponce* (LPD 15). On LPD 15, the SPS-40 is located 46 feet lower on the mast than on the rest of the LPD 4 Class. Therefore, more of the SPS-40 main beam impinges on the crane electronics on LPD 15 and causes EMI problems. The higher elevated SPS-40s on the other ships of the LPD 4 Class do not cause EMI to their cranes.

Operational Impact:
Unsafe crane operations.

Recognition Symptoms:
The crane boom shakes when the AN/SPS-40 antenna points towards the crane cab.

Solution

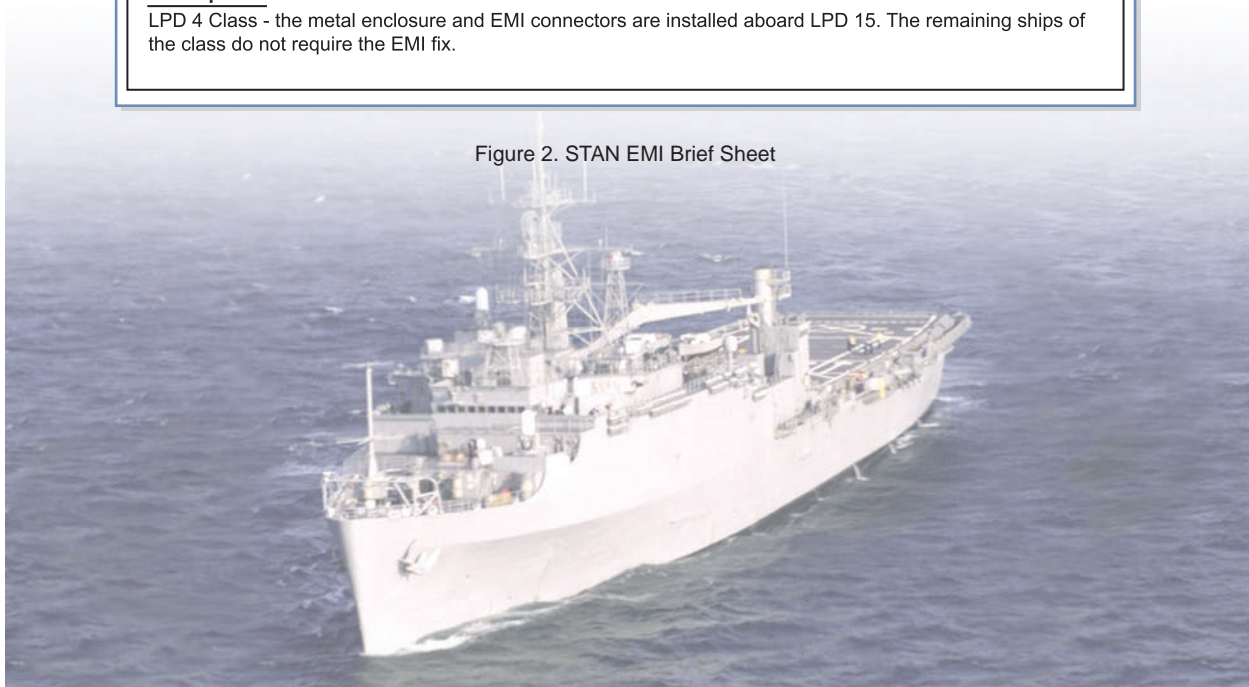
Fix ID:
METAL ENCLOSURE/EMI CONNECTOR

Description:
The fiberglass enclosure that contained the programmable logic controller (PLC) was replaced with a metal enclosure. The stuffing tubes where cables entered the fiberglass enclosure were replaced with connectors and EMI backshells. Where cable shields were present, they were connected to the EMI backshells. The metal enclosure and EMI connectors mitigated the effects of the AN/SPS-40 energy on the crane electronics enough to fix the problem on LPD 15.

Status

Description:
LPD 4 Class - the metal enclosure and EMI connectors are installed aboard LPD 15. The remaining ships of the class do not require the EMI fix.

Figure 2. STAN EMI Brief Sheet



and the interference mechanism(s) involved. It includes a breakout of all the ship classes that have the source-victim pair installed and ship class-specific data related to the EMI problem. The operational impact section describes what the mission impact is to the ship if the EMI is present. The problem category is derived from the operational impact. If the victim system is unable to perform its mission, it is a category 1 problem. If the victim system is able to perform its mission in a degraded state, it is a category 2 problem. If the victim system is able to perform its mission with the EMI being more of a nuisance, it is a category 3 problem. The recognition symptoms section provides data on how to recognize if an EMI problem is present. For example, this will state whether to monitor a satellite communications system's bit error rate (BER) for an increase or observe a radar's plan position indicator (PPI) display for a decrease in contacts and range. The fix ID section lists any permanent or interim fixes that were developed to mitigate the EMI. The fix description section provides the specifics of the fix(es). Finally, the fix status section includes a breakout of the ship classes that have the fix installed or information on why a particular ship class may have the EMI problem but not have the fix installed. Also, if a fix has not been determined yet, this section provides information on possible fixes that are being assessed.

AFFECTED SHIPS LIST

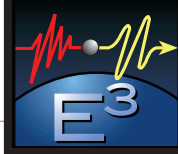
The affected ships list goes hand-in-hand with the EMI brief sheet. This is a list of all the ships that may be affected by the problem. In the ship status field, the ship may have a status of predicted, confirmed, or fixed. Predicted means that an assessment was made and it was determined that—based on other ships in the class having the EMI problem or due to the likelihood of the EMI problem occurring on this ship—the ship should reflect this status. Confirmed means that the EMI problem was observed aboard this

ship. Fixed means that the EMI fix has been installed aboard this ship. The list also includes the fix installation date, if fixed, what fix was installed or needs to be installed, and the documentation that verified the ship status. Figure 3 is the affected ships list for SPN 1-07.

EMI TEST PROCEDURES

Step-by-step EMI test procedures are developed for all category 1 and 2 problems. There are two types of test procedures: recognition and visual. Recognition test procedures are created to determine if an EMI problem is present. To make this





Status of Problem 1-07-HA on Affected Ships

<u>Problem No.</u>	<u>Source Victim Modifier</u>	<u>Prob. Status</u>	<u>Category</u>
1-07-HA	AN/SPS-40 B&A CRANE SPS-40 MAIN BEAM	RESOLVED	1

<u>Hull No. Class</u>	<u>Ship Status</u>	<u>Scheduled Installed</u>	<u>Fix ID</u>	<u>Remarks</u>
LPD-15 (LPD-4)	FIXED	COMPLETE 1/15/2009	METAL ENCLOSURE/EMI CONNECTOR	FIX (I), SEMCIP VERIFIED, DOC 85603

Total Corrected: 1
 Total Uncorrected: 0
 Total Ship(s) Affected: 1

Figure 3. Affected Ships List

determination, the possible EMI victim system is monitored for degradation while the possible EMI source system is transmitted in various modes or cycled between the on and standby/off state. A visual test procedure is created to verify that a required EMI fix is installed. Each procedure includes data sheets that should be filled in during the test. The EMI test procedures play a vital role in Ship EMC Certification events, which ensure that all required EMI fixes are installed and that all EMI problems have been identified aboard a ship.

SHIP EQUIPMENT LIST

STAN has an equipment list for each ship tailored to focus on EMI-relevant systems. On the list, the equipment is divided into the following categories:

- Electronic warfare (EW)
- Hull, mechanical, and electrical (HM&E)
- Avionics
- Navigation
- Sonar
- Communications
- Radar
- Weapons

These lists are verified/updated as part of each Ship EMC Certification event.

E3 DOCUMENT LIBRARY

The last primary product that STAN provides is a vast E3 document library. It includes EMI test reports, ship EMC certification reports, RAD-HAZ survey reports, and E3 policy and guidance documents, among others. Many documents are available online, with the remaining available by contacting STAN database personnel. Figure 4 is the document list for SPN 1-07.

A shipboard radar, communication, or EW system degraded by EMI can put the ship and its crew in danger. If not for SEMCIP, aided by the STAN database, warfighters might not be able to successfully perform their missions. By using STAN, EMI problems and fixes can be quickly identified, if the problem was previously observed. If not, the EMI problem details are recorded in STAN as SEMCIP works towards mitigating the EMI. As one can see, STAN is a one-stop shop for E3 data and is vital for ensuring that shipboard systems oper-

Document List for Problem 1-07-HA				
<u>Problem No.</u>	<u>Source Victim Modifier</u>	<u>Prob. Status</u>	<u>Category</u>	
1-07-HA	AN/SPS-40 B&A CRANE SPS-40 MAIN BEAM	RESOLVED	1	

<u>Doc Date</u>	<u>Doc#</u>	<u>Doc Type</u>	<u>Originating Activity</u>	<u>Title/Subject</u>	<u>FICHE # ROW COL</u>
1/15/2009	85603	PROBLEM UPDATE	NSWCDD Q54	SPN 1-07 BRIEF SHEET UPDATE	
8/20/2008	84391	STAN EVENT NOTIFICATION	NSWCDD	SPS-40 TO SHIPS CRANE ON LPD 15	
7/15/2008	83991	PROBLEM UPDATE	NSWCDD, Q54	FORMATTED SPN 1-07 BRIEF SHEET	
3/13/2008	83077	PROBLEM UPDATE	NSWCDD, Q54	UPDATES TO SPN 1-07	U- ROM35
8/22/2007	81883	EQUIPMENT INFO	NSWCDD	LPD 15 EMI ISSUE: SPS-40 RADAR TO B&A CRANE	U- ROM35
7/6/2007	81643	EMI SURVEYS	GENERAL DYNAMICS IT	SEMCIP ACTIVITY REPORT: Q54-07-052 AN/ SPS-40 EMI TEST TO CRANE ABOARD USS PONCE (LPD 15)	U- ROM34
6/18/2007	81503	EQUIPMENT INFO	NSWCDD	LPD-15 EMI ISSUE: SPS-40 RADAR TO B&A CRANE	U- ROM34
6/18/2007	81504	EQUIPMENT INFO	NSWCDD	USS PONCE (LPD 15)	U- ROM34
6/15/2007	83276	EMI CASREP	NSWCDD	CRANE EMI CASREP ABOARD USS PONCE LPD 15 (U)	
5/28/2007	83278	EMI CASREP	NSWCDD	CRANE EMI CASREP ABOARD USS PONCE LPD 15 (U)	

10 Documents Found

Figure 4. Document List

EMI STRIKE GROUP CAPABILITIES AND LIMITATIONS

By John Gammon, II and Alexi Schandl

FOUNDATIONAL EFFORTS

U.S. naval strike groups (SGs) must remain ready to perform their missions despite challenges in the electromagnetic (EM) environment. Naval Sea Systems Command (NAVSEA), Electromagnetic Capability and Spectrum Management (SEA 05H34), focuses on EM controls to ensure that emitter systems do not create interference for combat systems. An essential part of maintaining controls has to do with understanding SG capabilities and limitations (C&L) with respect to electromagnetic environmental effects (E3).

Naval Surface Warfare Center, Port Hueneme Division (NSWC PHD) initially developed paper C&L products, which led to web-based combat system C&L manuals starting over 20 years ago. The Strike Group C&L is NAVSEA's report out to warfighters and trainers about everything the technical community knows concerning tactical data link (TDL) and the Global Command and Control System (GCCS) operations and systems interoperability. C&Ls are delivered and frequently updated via the Secure Internet Protocol Router Network (SIPRNET); they have also been made available to the fleet on CD-ROM to accommodate limited or no SIPRNET connectivity. NAVSEA (SEA 05) sponsors the interoperability C&L and funds conversion of C&L data into extensible markup language (XML) format to facilitate exchange of technical information with weapon, combat system, and electromagnetic interference (EMI) C&L projects.

The requirement to share technical data and provide the best products to the fleet started a synergistic partnership between NSWC PHD and the Naval Surface Warfare Center (NSWC) Dahlgren. They continue working together to support fleet awareness of EMI and electromagnetic compatibility (EMC) for topside antenna, sensor and weapon systems, and for systems located within the hulls of naval vessels.

EMI STRIKE GROUP C&L PRODUCT DEVELOPMENT

NAVSEA's Strike Group Electromagnetic Environmental Effects (E3) and Spectrum Management Engineering Branch, which holds the technical warrant for EMI/EMC and spectrum management, subsequently established the Strike Group EM Engineering Concept of Operations (CONOPS) Process. This process provided a methodology for achieving SG EM interoperability within the Fleet Response Plan. One of the elements of the EM Engineering CONOPS was to ensure that SG deficiencies, impacts, and risks to warfighting capacity were identified and documented in a readily accessible C&L application. Requirements stemmed, in part, from a survey that was

provided to shore squadrons in Little Creek, Virginia, to gain insights on EMI and EMC product viability and fleet effectiveness. The results of this survey culminated in the need for a comprehensive source of interference data, a high-level EMI summary, and a centralized source of EMI and radiation hazard (RADHAZ) data. That then led to the development of NSWC Dahlgren-produced software capable of producing web-page-based CDs that would allow SG commanders and platform commanding officers the ability to search for overall system impacts and ship specific impacts due to EMI, RADHAZ, and littoral frequency operational restrictions (Afloat Electromagnetic Spectrum Operations Program (AESOP))—products produced for the fleet by NSWC Dahlgren's E3 Force Level Interoperability Branch.

DATA MANAGEMENT

The EMI Strike Group C&L Data Management System takes data from multiple sources and filters and selects data pertinent to a particular SG by platform and systems. ColdFusion software converts the data into hypertext markup language (HTML); JAVA (platform-independent, object-oriented programming language) scripts; and cascading style sheet (CSS) files. The product is provided to SGs via the SIPRNET web pages and also by

CD-ROM delivery to each ship within a given SG. A depiction of the C&L Data Management System is shown in Figure 1.

C&L helps improve fleet awareness of E3 and impacts for all ships and associated systems. C&L navigation requires only the availability of Internet Explorer (web browser) and Adobe Acrobat Reader. It affords fleet users access to Port Hueneme- and Dahlgren-produced products, including SEMCIP, AESOP, and RADHAZ products—all of which are used in direct support of the Electromagnetic Interference (EMI) Strike Group C&L product. The application also hosts platform-centric data, including littoral frequency restrictions and system-centric EMI source-victim assessments (EMI executive summaries). All of this data helps facilitate making EM impacts and vulnerabilities to ship systems understandable to the warfighter. A depiction of the EMI Strike Group C&L application is shown in Figure 2.

PRODUCT USE AND NAVIGATION

Separate pull-down menus handle online product navigation. SG links lead users to specific SGs. The HELP Menu provides navigation to actual HTML SG products. References provide additional information concerning SEMCIP, SEMCIP points-of-contact, and EMI-EMC terms

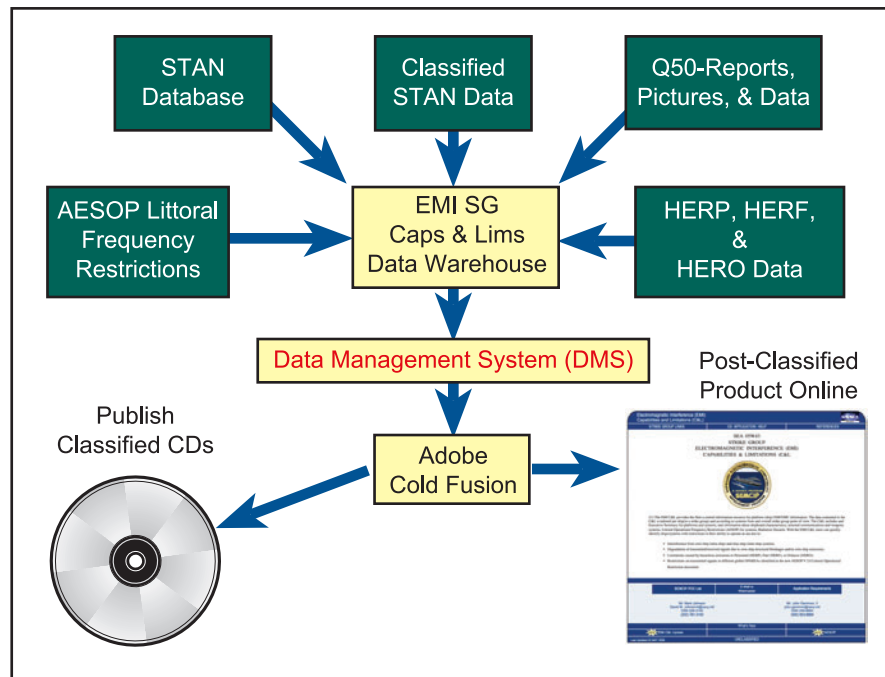


Figure 1. EMI SG Capabilities and Limitations Data Management System (DMS)

Electromagnetic Interference (EMI)
Capabilities and Limitations (C&L)

STRIKE GROUP LINKS

CD APPLICATION HELP

REFERENCES

SEA 05H34
STRIKE GROUP
ELECTROMAGNETIC INTERFERENCE (EMI)
CAPABILITIES & LIMITATIONS (C&L)

(U) The EMI C&L provides the fleet a central information resource for platform (ship) EMI/EMC information. The data contained in the C&L is tailored per ship (in a strike group) and according to systems from an overall strike group point of view. The C&L includes and Executive Summary for platforms and systems, and information about shipboard characteristics, selected communications and weapons systems, Littoral Operational Frequency Restrictions (AESOP) for systems, and Radiation Hazards. With the EMI C&L, users can quickly identify ships/systems with restrictions in their ability to operate at sea due to:

- Interference from own-ship (intra ship) and ship-ship (inter ship) systems;
- Degradation of transmitted/received signals due to own-ship structural blockages and/or own-ship emissions;
- Limitations caused by hazardous emissions to Personnel (HERP), Fuel (HERF), or Ordnance (HERO);
- Restrictions on transmitted signals in different global OPAREAs identified in the new AESOP V 2.0 Littoral Operational Restriction document.

SEMCIP POC List

E-Mail to Webmaster

Application Requirements

EMI C&L Update

What's New

AESOP

Last Updated 22 MAY 2008

UNCLASSIFIED

Figure 2. Strike Group Electromagnetic Interference (EMI) Capabilities and Limitations (C&L)

and definitions. An unclassified depiction of the classified web-page application is shown in Figure 3.

EMI STRIKE GROUP C&L PRODUCT DELIVERY AND USAGE

During the course of fiscal year 2008 (10/2007–8/2008), there were 11 EMI Strike Group C&L SG deliveries, which encompassed 64 ships and 11 shoreside commands (deliveries). These deliveries consisted of online web-posting of each SG, coupled with delivery of CDs to each ship within each SG (and to each shoreside command). Online usage metrics revealed that the EMI Strike Group C&L web page was accessed 924 times throughout

the fiscal year. Additionally, there were between 78 and 243 hits (web accesses) per SG. Other areas of notable usage within each SG were:

- EMI documents (brief sheets used to describe EMI problem characteristics, impacts, and solution workarounds)
- RADHAZ Surveys (hazards of electromagnetic radiation to personnel (HERP) and hazards of electromagnetic radiation to ordnance (HERO)) and related core HERP–HERO publications (OP 3565 Volumes 1 and 2)
- Frequency management (AESOP) data and documents (OP 3840 and AESOP Littoral Operational Restrictions)

**Electromagnetic Interference (EMI)
Capabilities and Limitations (C&L)**



STRIKE GROUP LINKS	CD APPLICATION HELP	REFERENCES
STRIKE GROUP LINKS	HELP MENU	REFERENCES
<p>BONHOMME RICHARD (LHD 6) ESG 07 SSG 07-02 ESSEX (LHD 2) ESG 07 KEARSARGE (LHD 3) ESG 07 HARRY S. TRUMAN (CVN 75) CSG 07 THEODORE ROOSELVET (CVN 71) CSG 08 IWO JIMA (LHD 7) ESG 08 AFSB 082 GEORGE WASHINGTON (CVN 73) CARAT 08 OTHERS, PLANNED</p>	<p>What is EMI CAPS & LIMS Using EMI CAPS & LIMS Table of Contents Download Help Document (2.9 MB PDF)</p>	<p>EMAC Brochure (7 MB PDF) SEMCIIP Brochure (1.4 MB PDF) EMI-EMC Terms and Definitions (153KB PDF) SEMCIIP, EMI, & EMC Points of Contacts (30KB PDF) EMI C&L Survey (TBD)</p>



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SEMCIIP POC List

E-Mail to Webmaster

Application Requirements

★ NEW EMI C&L Update

What's New

★ NEW AESOP

Last Updated 22 MAY 2008
UNCLASSIFIED


Figure 3. EMI Strike Group Capabilities and Limitations Web Page

NAVSEA WARFARE CENTER COLLABORATION

NSWC PHD and NSWC Dahlgren teaming together resulted in enhanced fleet support. These joint efforts not only provided warfighters with readily accessible system impact awareness, but also with problem resolution and workarounds for topside systems. The NSWC Dahlgren EMI C&L development team worked closely with NSWC PHD's C&L team to set up an EMI Strike Group product web page within NAVSEA's C&L SIPRNET site. Remarkably, there were no developmental costs involved beyond a few man-hours for EMI Strike Group C&L web-page design and publishing. Subsequent efforts

resulted in the classified AESOP web page also being hosted on the NAVSEA C&L web server and, again, there were minimal costs in the migration of the AESOP data to the NAVSEA C&L SIPRNET site.

As a result of NAVSEA and NSWC's collaborative efforts, sailors now have real-time, online access to classified EMI Strike Group C&L information, giving them a technically accurate and user-friendly product for making informed decisions about platform and SG readiness. It also gives fleet operators communications and reach-back access to E3 expertise located in the Electromagnetic Mission Assurance Center (EMAC) at NSWC Dahlgren, Virginia.



WHEN THE NAVY IS NOT FIGHTING, IT IS TRAINING.
WHEN THE NAVY IS FIGHTING, IT IS TRAINING.

By Wayne Lutzen

These are exciting times for Navy training and the electromagnetic compatibility (EMC) disciplines. Both areas have undergone a period of transition in recent years and are continuing to evolve in a spirit of joint cooperation.

Some of the influences listed below have played critical roles in the work being performed and are pivotal to understanding the rationale behind this effort.

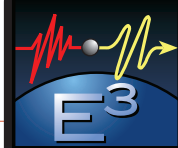
- Pentagon personnel are getting grayer. According to estimates, between 40–60% of the Defense Department's total civilian workforce will be eligible to retire in the next 3–5 years. (Positions will need to be filled at the right skill levels.)
- We have a new generation (“Millennium” or “Gen Y”) of sailor entering the Navy that grew up with the Internet, who is collaborative and technologically savvy.
- There are preferred training formats (i.e., instructor-led training (ILT), distance learning (e-Learning), simulated, virtual, etc.).
- There is a transition to joint warfare.

This article highlights those NAVSEA 05W43 actions in support of the Revolution in Training (RiT).

IMPETUS

Several major changes in philosophy and organization—both in the Navy and as a result of industry's perception of training—have combined to create a new and dynamic career environment for naval personnel in electromagnetic environmental effects (E3) and spectrum management (SM) disciplines. For many years, both the Navy and industry have seen rapid growth in the development of e-Learning to support ILT and as stand-alone training to reach large, geographically dispersed audiences. These changes in training philosophy coincided with program transitions and organizational changes within the Department of the Navy (DON).

- The Chief of Naval Operations (CNO) established the Naval Education and Training Command (NETC), which replaced the Chief of Naval Education and Training (CNET).
- NETC launched the RiT with the goal of creating a systematic approach to training, supported by continuums of learning, with job assignments matched to those skills required by fleet missions.
- Navy, from the top down, has advocated a charter under RiT in which every person in a position of authority has an obligation



to the mission and to support each sailor's growth to its fullest potential. The mission of the NETC is to educate and train those who serve, providing the tools and opportunities that ensure fleet readiness and mission accomplishment, enhance professional and personal growth and development, and enable lifelong learning.

- Department of Defense (DoD) policy since 2004 has stressed the need to develop mission essential tasks (METs) for all assigned missions, to use information technology to collect near real-time data on mission readiness, and to train all personnel and components on their METs. The ultimate goal is to provide a lean, quick, and agile organization capable of providing properly trained personnel to the fleet, thereby increasing operational readiness and maximizing mission accomplishment.

NAVY TRAINING SYSTEM PLAN (NTSP)

As directed by the CNO, the NTSP provides the framework and details the requirements for implementing E3/SM training for Navy and Marine Corps ships, aircraft, and shore stations. The NTSP addresses selected formal training and on-board training (OBT) courses for DON personnel responsible for the design, development, production, test, installation, operational use, and maintenance of equipment, systems, and platforms.

Naval Sea Systems Command (NAVSEA) 05H343 is the Principal Development Agent for the E3/SM NTSP. NAVSEA assigns the Space and Naval Warfare Systems Center (SPAWARSYSCEN) Atlantic 56170 as the In-Service Engineering Agent (ISEA) responsible for the engineering, updating, coordination, maintenance, publication, and distribution of the NTSP. The three warfare sponsors (i.e., SPAWARSYSCEN Atlantic, the Naval Undersea Warfare Center Division Newport (NUWCDIVNPT), and the Naval Air Systems Command (NAVAIR)) are each responsible for developing, updating, and maintaining related E3/SM courseware for ship, submarine, and air platforms.

WHERE WE ARE NOW—THE ALIGNMENT OF TRAINING TO MISSION ESSENTIAL TASKS

Training is an integral part of the U.S. Navy's preparation to go anywhere, take on any adversary, and win! As such, Navy units train as they expect to fight. This warfighting training philosophy provides the Navy with a unifying goal for individual

and collective training. With this common thread woven throughout Navy units, and with the nation requiring greater accountability of public funds, effective and efficient training must focus on attaining and maintaining the state of operational readiness of fleet units.

The DoD is seeking to meet this need by requiring a Fleet Training Continuum that is capabilities-based and derived from authoritative METs.^{1,2} Policy³ now requires all DoD components to develop METs or similar indicators for all assigned missions and use information technology to collect near real-time data on the readiness of military forces and support organizations to perform these missions.

Based on DoD and Navy policy, NAVSEA, SPAWARSYSCEN Atlantic, and the Naval Network Warfare Command (NETWARCOM), in partnership, are positioning the naval EMC and SM community to provide maximum warfighting capabilities to the combatant commander.

To this end, the implementation of the Navy Warfare Training System (NWTs) has begun. The NWTs is a means of sharing the knowledge base of Navy mission essential task lists (NMETLs), judging readiness, and improving the training and readiness processes. Information from different groups pursuing training tasks can be shared and compared by using the Navy Training Information Management System (NTIMS).

Figure 1 represents a "Navyized" version of the Joint Training System (JTS). The NWTs is a cyclic building block approach to training naval forces based on METs.

- **Requirements**—Analysis of mission leads to a list of tasks with associated conditions and standards. Analysis of essentiality, along with organizations that play a part, produces a mission essential task list (METL), which feeds the plans phase. Requirements are derived from assigned missions based on command's core missions and Joint/Navy Doctrine. The requirements phase will produce the NMETLs, tasks, conditions, and standards.
- **Plans**—Uses the NMETL to answer the question who, what, when, where, and how training will be conducted. Training methods and resources are allocated to training requirements. Output is training plans at all levels.
- **Execution**—Completes the training events and collects necessary data, observations, lessons learned, and after action reports (AARs). This information feeds the assessment phase.

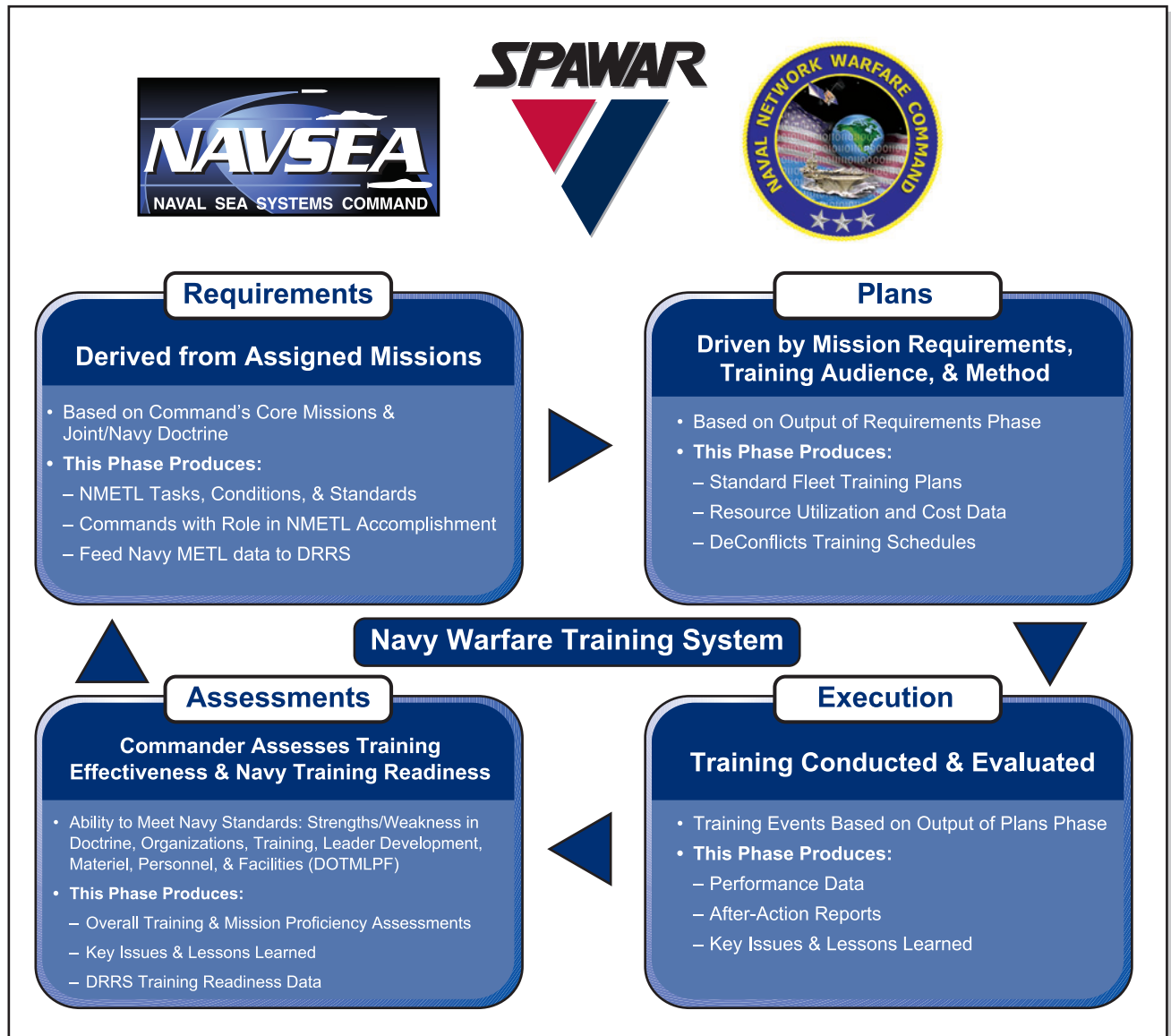


Figure 1. The Naval Warfare Training System (NWTS)

- **Assessment**—Determines mission capability from a training viewpoint. Provides feedback to adjust or improve training.

SPAWARSYSCEN Atlantic has led the charge in the Requirements Phase by collecting all policy and guidance relating to the organizations that support the Navy's electromagnetic interference (EMI) control and SM programs. This was a year-long effort to gather materials and meet with subject matter experts (SMEs).

In support of the Requirements Phase, NETWARCOM and SPAWARSCEN Atlantic sponsored an "E3-SM NTSP and Manpower, Personnel, and Training (MPT) Requirements Review" on 25–29 September 2006. The conference was in support of the CNO's RiT. The purpose of the conference was to unify E3/SM SMEs and develop the job task analysis (JTA) for E3/SM. The JTA process documents all skills required for E3/SM performance and operational requirements. These skills support



manpower and training required at all levels of the Navy. E3/SM disciplines are currently supported by Navy Enlisted Classifications (NECs) ET-1419, IT-2301, and IT-2302.

The conference resulted in the validation of the JTA skills. Two working groups (E3 and SM) reviewed and arbitrated the required JTAs for personnel at all five tier levels (from fleet unit to the national level). As a part of the JTA process, the groups conducted a detailed review of each tier, including discussions of task, subtask, and steps, and the knowledge, tools, and resources for each task, followed by measure assignments for each task and subtask. The group determined the E3/SM respective Manpower Career Paths for U.S. Navy enlisted, officer, contractor, and government service personnel. Based on data developed during the JTA process, initial Navy mission essential tasks (NMETs) were reviewed for the respective E3/SM mission areas.

These NMETs will provide the basis for training requirements and identify the required level of readiness, resulting in the implementation of curriculum standards and an adequate manning and resourcing training continuum. The proposed SM and EMI control METs are being refined and entered into the NTIMS for assignment to organizations that have task performance responsibilities. The Defense Readiness Reporting System–Navy (DRRS-N) will allow operational commands to report the status of meeting required mission capabilities as related to E3, EMI Control, EMC, SM, and electromagnetic pulse (EMP) protection.

Once the mission, function, tasks, standards (measures and criteria) have been agreed upon and approved, the efforts to develop specific training to a specific NMET will begin. The mapping of SM/EMI Control NMETs to Organizational Learning Goals will allow for the development of Navy Learning Objective Statements (NLOS), which will aid in determining the number of courses that will be needed to fulfill SM/EMI control manning and training requirements as well. This will affect all organizations and personnel (enlisted, officer, contractor, and government). When the approved SM/EMI control NMET measures are assigned to

the applicable organization within NTIMS, metrics can be collected within DRRS-N to determine if the NMET is being performed to a specified requirement.

NKO COMMUNITY OF PRACTICE (COP) WEBSITES

Navy Knowledge Online (NKO) is a web portal (see Figure 2) used by active duty, reserve, retired, enlisted, and officers of the U.S. Navy. It is also open to civilians and contractor support personnel. NKO provides information and resources such as career management, personal development, leadership, learning, references, and more. These resources can be used for personal and professional development, including: Navy electronic training (e-Learning), tapping into the wealth of knowledge held by retirees, and otherwise sharing knowledge.

- Navy e-Learning provides eight courses related to EMI control for surface, submarine, and air platforms. These training courses are examples of education that a sailor, a government employee, or a contractor can use.
- Allowing Navy retired personnel access to NKO is one smart strategy for making this large pool of knowledge available to current active duty and reserve personnel. By keeping the channels open among retired, active duty, and reserve, the communications pipeline stays open, and knowledge is shared.
- One interesting way of sharing information is through the COP program. COP allows people in a specific interest group to share best practices, advice, and expertise in organizational, functional, and operational knowledge.

In support of the E3 and SM community, two NKO COPs have been developed: the EMC COP and the SM COP. The focus is on continuous learning, mutual exchange, and collaboration. These COPs also provide support to government civilians and contractors in the disciplines of E3 and SM.

- The EMC COP is sponsored by the Center for Surface Combat Systems (CSCS). The mission of this COP is to provide support for the NEC ET-1419 “EMC Technician.”



<https://wwwa.nko.navy.mil/portal/home>

Figure 2. Navy Knowledge Online url

- The SM COP is sponsored by the Center for Information Dominance (CID). The mission of the SM COP is to provide support to the NEC IT-2301 “Enlisted Frequency Manager” and the NEC IT-2302 “Joint Task Force (JTF) SM Master Level.”

NKO is one tool Navy leaders should use and encourage others to use. When supervisors have a new check-in, they should encourage the establishment of an NKO account. This is a good way to assist new members with personal and professional growth.

THE TRANSITION TO DRRS-N

The fleet began transitioning to DRRS-N on 1 October 2008. DRRS-N is a major shift in readiness thinking and reporting, moving the focus from reporting unit resources and training to assessing and managing force capabilities. Afloat units are receiving the DRRS-N hardware and software to facilitate the transition. Virtually all commander, Navy installation command shore stations, and regional commanders worldwide are already reporting in DRRS-N. Many other shore-based commands have begun the transition as well.

UP ALL ANCHORS, FULL SPEED AHEAD

The Navy is changing the basis for training development from a curriculum based on a sailor's rate to one based on NMETLs, joint mission essential task lists (JMETLs), and agency mission essential task lists (AMETLs). Each position on a Navy platform (e.g., ship, submarine, aircraft, or ashore command) will have a supporting Job Task Analysis/Job Analysis (JTA/JA) that will determine the training required for an individual to fill that position. An individual's skills, as defined in an individual's career path, will be compared against the position requirements.

The *Spectrum Management Manual, Naval Tactical Publication (NTP)-6* provides procedures for the effective execution of SM within the Navy and Marine Corps. NTP-6 was recently updated to include responsibilities for spectrum and E3 personnel. EMC can occur only when all phases of spectrum supportability,⁴ spectrum certification, frequency assignment, and E3 are understood and performed through effective task execution.

Our challenge is to ensure that SM and E3 NMET's requirements are appropriately included in the various JTA/JAs and in the training products' development, which supports these tasks and

the overall Joint/Navy missions. For web-based training (WBT) products, NAVSEA is committed to share E3/SM WBT materials within our communities and across services. To accomplish this, future NAVSEA contracts must meet DoD Shareable Content Object Reference Model (SCORM) requirements, which are a collection of standards and specifications for web-based e-Learning.

An effective training program must support the NWTs, which is based on mission, function, and tasks tied to personnel training requirements and maintained using a continuous improvement process (CIP). E3/SM NTSP stakeholders should, at a minimum, enroll in NKO at www.nko.navy.mil to investigate the world of possibilities. For example, E3 training is offered at the Center for Combat Systems (CSCS) Learning Site, Norfolk, Virginia, and additional information can be researched at the EMC Communities of Practice website. In addition, a wealth of spectrum information can be obtained from the SM COP website.

When the Navy is not fighting, it is training. When the Navy is fighting, it is training. The most important ingredient in the Navy's success is the talent, energy, dedication, skill, and courage of our sailors. Their growth and development is the highest priority of Navy leaders. The U.S. Navy is engaged in an enterprise-wide transformation of how it operates in an effort to improve and align its organizations, incorporate new technologies into Navy training, exploit opportunities available from the private sector, and develop a continuum of lifelong learning and personal and professional development for sailors. This transformation is helping to keep our Navy #1 in the world.

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E3 – Electromagnetic Environmental Effects

LEADING

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FALLEN WARRIORS
*Here we honor those who died
while serving their country*



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