



DEPARTMENT OF THE NAVY  
NAVAL SEA SYSTEMS COMMAND  
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WASHINGTON NAVY YARD DC 20376-0001

IN REPLY REFER TO  
NAVSEAINST 2400.20A  
Ser 05W/023  
27 Dec 2022

NAVSEA INSTRUCTION 2400.20A

From: Commander, Naval Sea Systems Command (SEA 05)

Subj: ELECTROMAGNETIC ENVIRONMENTAL EFFECTS AND SPECTRUM  
SUPPORTABILITY PROGRAM AND PROCEDURES

Ref: See enclosure (1)

Encl: (1) List of References

1. Purpose. This instruction establishes Naval Sea Systems Command (NAVSEA) policy and procedures and assigns responsibilities for electromagnetic environmental effects (E3) and spectrum supportability (SS) requirements to ensure electromagnetically reliable, safe, and mission capable operations. This instruction implements reference (a). This instruction is a complete revision and should be read in its entirety. A summary of changes is reflected in subparagraphs 1a through 1d.

a. Added a background section, updated legacy terminology, and removed prior enclosures.

b. Added policies for ship electromagnetic compatibility (EMC) and radiation hazards (RADHAZ) certifications as well as shipboard EMC and RADHAZ assessments for systems to be operated aboard ships and submarines.

c. Streamlined the SS procedures since they are codified in reference (b).

d. Added responsibilities for performing shipyards and maintenance planning activities and updated responsibilities for Integrated Warfare Systems Engineering (SEA 05H) and Surface Warfare Systems Engineering (SEA 05W).

2. Cancellation. NAVSEAINST 2400.20 of 21 August 2012.

3. Scope and Applicability

a. This instruction applies to all equipment, systems and platforms (including: developmental and commercial off the shelf (COTS); subsystems; weapons; electrical, electronic, or electromechanical equipment; networks; sensors; and fuels) developed, procured, acquired, operated, or maintained by NAVSEA and affiliated program executive offices (PEO).

b. Hazards of electromagnetic radiation to ordnance (HERO) are excluded from this instruction and are addressed by NAVSEAINST 8020.7E. Hazards of electromagnetic radiation

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to personnel (HERP) and fuels (HERF) (hereinafter referred to as RADHAZ) are within the scope of this instruction.

c. The requirements of this document do not apply to systems in Naval nuclear propulsion plants systems under the cognizance of Naval Nuclear Propulsion (SEA 08). For SEA 08 cognizant equipment (and for all Naval nuclear propulsion plant systems) with applicability outside the propulsion plants (such as power distribution equipment or wireless devices), or equipment that poses a RADHAZ or HERO concern, SEA 08 will coordinate technical reviews directly with Naval Systems Engineering and Logistics (SEA 05) as necessary. SEA 08 is the approval authority for all wireless transmitters to be used within Naval nuclear propulsion plant spaces. The use of wireless devices that have not been approved by SEA 08 within submarine and aircraft carrier propulsion plant spaces is not permitted.

d. This instruction is applicable to equipment, systems and platforms acquired by other agencies, services, and commands when installed or embarked on United States Navy (USN) ships or submarines.

#### 4. Background

a. As defined in Joint Publication 3-85, Joint Electromagnetic Spectrum Operations, E3 is the impact of the electromagnetic environment (EME) upon the operational capability of military forces, equipment, systems, and platforms.

b. Consistent with reference (c), SS is the assessment that determines whether the radio frequency (RF) or microwave spectrum is, or will be, available to support the operation of a system during its expected life cycle. SS requires the ability to get equipment spectrum certification (ESC), host nation certification, frequency assignments, and EMC. There are no waivers or deviations allowed for the requirements to obtain ESC or frequency assignments as these are statutory requirements.

c. Reference (d) establishes Department of Defense (DoD) policy for E3, and reference (e) establishes DoD policy for management and use of the electromagnetic spectrum. References (f) and (c) establish Department of Navy (DON) policy for E3 and electromagnetic spectrum, respectively.

d. Reference (a) establishes the USN E3 and SS policy and assigns responsibilities to NAVSEA.

#### 5. Policy

a. It is NAVSEA E3 policy that:

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(1) Per references (a) and (d), all equipment, systems, and platforms will meet their operational performance requirements in their intended EME without causing or suffering unacceptable mission degradation due to E3.

(2) E3 will be controlled primarily by prevention, then by correction, and lastly by mitigation.

(3) Per reference (a), E3 control must be designed into a system from inception, incorporated in a cost-effective manner, and maintained throughout the life of equipment, systems, and platforms.

(4) References (g) through (m) are military E3 standards defining interface and verification requirements, establishing operational environments, and specifying developmental and operational test methodologies. These standards must be used by NAVSEA, NAVSEA activities, and affiliated PEOs for E3 control.

(5) Per reference (d), analytical tools and databases for EMC analysis and E3 assessment must be developed and maintained to predict, prevent, track, and correct E3 deficiencies aboard ships and submarines.

(6) If an authorized fix is readily available for a shipboard EMI problem, then the fix must be implemented prior to operational use of the affected equipment, system, or platform. If a fix has been approved but is not available, it must be tracked per reference (n), volume VI, to be resolved during the next scheduled maintenance availability.

(7) Consistent with reference (a), all ships must be certified for EMC and RADHAZ prior to deployment. Consistent with reference (n), all submarines will be surveyed for EMI prior to deployment.

(8) Consistent with reference (f), an EMC analysis must be conducted for all RF and microwave spectrum dependent systems to be installed or operated aboard ships or submarines to identify operational EMC risks.

(9) Consistent with reference (o), a RADHAZ analysis must be conducted for all transmitters to be installed or operated aboard ships or submarines to identify any required safety measures.

(10) Naval shipyard personnel who work on ship and submarine electrical, electronic, and electromechanical equipment will receive biennial industrial EMC refresher training.

b. It is NAVSEA SS policy that:

(1) RF and microwave transmitting equipment must comply with reference (p).

(2) Developers of RF and microwave spectrum systems or the procuring organizations must follow the Navy SS business processes in reference (b).

(3) Per references (e) and (p), ESC requests and a spectrum supportability risk assessment (SSRA) must be submitted to the Navy and Marine Corps Spectrum Center (NMSC) for all RF and microwave spectrum-dependent equipment and systems, including global positioning systems (GPS), COTS and non-developmental items, electronic warfare (EW) and information warfare (IW) systems, and Federal Communication Commission (FCC) part 15 devices.

## 6. Responsibilities

### a. Acquisition Program Managers (PM) must:

(1) Ensure compliance with appropriate E3 and SS requirements that are in joint capabilities integration and development system (JCIDS) and other requirements documents, and ensure that the appropriate E3 and SS requirements, environments, and tests are included in appropriate acquisition artifacts.

(2) Ensure all equipment and systems installed in a platform under their cognizance (including equipment provided by other commands) conform to the requirements laid out in this instruction.

(3) Budget for E3 control and SS to ensure that these requirements are incorporated as early as possible into the design, development, test, evaluation, certification, and employment of equipment, systems, and platforms for which they have material acquisition or lifecycle support responsibility.

(4) Derive E3 and SS requirements for equipment, systems, and platforms by utilizing this instruction, military standards for E3, military handbooks, reference (b), and reference (h).

(5) Submit ESC requests and SSRAs with a cover letter to NMSC for approval prior to each acquisition development stage. Ensure submissions have SEA 05W E3/SS Technical Warrant Holder (TWH) concurrence. Establish safeguards to ensure that ESC is obtained before assuming contractual obligations for system development and demonstration, production and deployment, or procurement of any spectrum-dependent equipment.

(6) Per reference (d), establish a working-level integrated product team (IPT) (also known as an electromagnetic compatibility advisory board [EMCAB]) for all acquisition category (ACAT) I and ACAT II programs to address E3 and SS. Designate the SEA 05W E3/SS TWH, or an individual delegated by the SEA 05W E3/SS TWH, to chair or co-chair the IPT.

(7) Ensure that E3 analysis and testing is accomplished for all equipment, systems, and platforms to ensure safe and electromagnetically compatible operation in the intended EME.

(8) Ensure E3 test reports are provided to the SEA 05W E3/SS TWH. Any deviations in the test results from the procedure's requirements will be reviewed by the SEA 05W E3/SS TWH for potential EME operational compromise.

(9) Coordinate with the SEA 05H E3 program lead and SEA 05W E3/SS TWH, as required, on E3 and SS issues related to their program's equipment, systems, or platforms.

(10) When equipment will be installed topside on ships, coordinate with the Surface Ship Design and Systems Engineering (SEA 05D) integrated topside design (ITD) TWH for the E3 and SS elements of the ITD process.

(11) Ensure E3 risks are managed within the program's established risk management process.

b. Consistent with reference (a), SEA 05H must:

(1) Manage the shipboard electromagnetic and compatibility improvement program (SEMCIP) to prevent, detect, measure, analyze, report, and correct EMI deficiencies and address SS issues.

(2) Manage the Navy nuclear electromagnetic pulse (EMP) survivability program.

(3) Resource an E3 and spectrum management program lead to support E3 and SS requirements across cognizant PEOs and PMs

(4) Investigate and provide resolution to ship, submarine, and strike force E3 and SS issues prior to strike group deployment; coordinate proposed correction of E3 problems with PMs; and coordinate among the PM, SEA 05 technical authorities, and fleet representatives the operational performance degradation or impact for E3 problems that cannot be corrected within current capabilities or with current resources.

(5) Maintain the SEMCIP Technical Assistance Network (STAN) to be an online data repository of all ship, submarine, and strike force EMC problems and resolutions.

(6) Coordinate with Chief of Naval Operations (CNO) N2N6N1 and NMSC on SS issues affecting ships and submarines.

(7) Coordinate with SEA 05W and the joint spectrum center in the development and issuance of interface standards and handbooks for achievement and maintenance of E3 in equipment, systems, and platforms.

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(8) Participate in the DoD and DON E3 and SS IPTs to resolve cross-mission deficiencies and participate in other ad hoc working groups endorsed by CNO for E3 and SS collaboration.

(9) Ensure USN systems impacted by spectrum reallocation are properly addressed for sharing or loss of spectrum and attain comparable capability per section 923 of Title 47, US Code.

(10) Provide the Real-Time Spectrum Operations Program technically accurate data for fleet spectrum planning, deconfliction, and management.

(11) Develop and maintain the E3 and SS Navy Training Systems Plan (NTSP). Establish E3 and SS related training solutions for all DON personnel responsible for the design, development, production, test, installation, operational use, or maintenance of equipment, systems, and platforms developed, procured, acquired, operated, or maintained by NAVSEA, NAVSEA activities, and affiliated PEOs. Incorporate them into the NTSP, where appropriate, providing complete training solutions.

(12) Review ship changes and alterations for E3 and SS impacts as part of the navy modernization process and coordinate with SEA 05W to provide risk assessments for ship changes and alterations, consistent with COMUSFLTFORCOMINST/COMPACTFLTINST 4720.3C.

(13) Develop and maintain analytical tools, and databases for EMC analyses and E3 and SS assessments.

(14) Act as the project sponsor for data exchange agreements (DEA) with other nations on E3 (e.g., United States and United Kingdom DEA and United States and Norway DEA).

c. Consistent with reference (a), the SEA 05W E3/SS TWH must:

(1) Provide E3 and SS guidance to PMs throughout the acquisition process and support development of E3 and SS requirements and documentation.

(2) Coordinate with CNO N2N6N1 and NMSC on SS issues for ships and submarines.

(3) Review and concur with ESC requests and SSRAs prior to submission to NMSC.

(4) Develop and issue interface standards and handbooks consistent with the DoD EMC standards program for achievement and maintenance of E3 aboard ships and submarines.

(5) Act as the E3 and SS technical authority in review of ship changes and alterations for E3 and SS impacts and provide risk assessments in support of PEOs.

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(6) Coordinate with PMs and technical authorities to ensure E3 and SS requirements are properly applied to system and platform development, acquisition, and life cycle maintenance. Ensure these requirements are validated at appropriate points during development of equipment, systems, and platforms.

(7) Establish criteria for ship EMC certifications and ship RADHAZ certifications and designate certification agents.

(8) Chair or co-chair EMCABs for ACAT I and II programs.

(9) Participate in the DoD and DON E3 and SS IPTs, cognizant North Atlantic Treaty Organization (NATO) E3 working groups, and E3 DEA meetings.

d. NAVSEA Technical Authorities and their support networks assist program offices with engineering aspects of E3 and SS, and must coordinate with SEA 05W on E3 and SS matters that arise in their areas of cognizance concerning the development, acquisition, and life cycle maintenance of equipment, systems and platforms.

e. Naval Shipyards, Supervisors of Shipbuilding, and Regional Maintenance Centers must:

(1) Ensure industrial work standards reflect current EMC guidance (e.g., guidance related to bonding, grounding, shielding, materials, and cable spacing).

(2) Ensure EMC-related testing is performed at appropriate times prior to delivery by personnel trained on industrial EMC to meet the requirements of reference (n) and forward test results for inclusion into STAN.

f. In-service Program Managers and Planning Activities must:

(1) Ensure E3 requirements are included in all industrial work packages during availability planning and ensure both dockside and at-sea EMI tests are included in the integrated test package.

(2) Ensure satisfactory completion of industrial EMC requirements.

(3) Ensure that E3 surveys, assessments, and inspections are conducted during readiness evaluations per the class maintenance plans.

## 7. Records Management

a. Records created as a result of this instruction, regardless of format or media, must be maintained and dispositioned per the records disposition schedules located on the Department of the Navy/Assistant for Administration (DON/AA), Directives and Records Management

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Division (DRMD) portal page at [https://flankspeed.sharepoint-mil.us/sites/NAVSEA\\_HOME/Docs/Instructions/Forms/AllItems.aspx](https://flankspeed.sharepoint-mil.us/sites/NAVSEA_HOME/Docs/Instructions/Forms/AllItems.aspx).

b. For questions concerning the management of records related to this instruction or the records disposition schedules, please contact your local records manager.

8. Review and Effective Date. Per OPNAVINST 5215.17A, SEA 05W and SEA 05H will review this instruction annually around the anniversary of its issuance date to ensure applicability, currency, and consistency with Federal, Department of Defense, Secretary of the Navy, and Navy policy and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will be in effect for 10 years, unless revised or cancelled in the interim, and will be reissued by the 10-year anniversary date if it is still required, unless it meets one of the exceptions in OPNAVINST 5215.17A, paragraph 9. Otherwise, if the instruction is no longer required, it will be processed for cancellation as soon as the need for cancellation is known following the guidance in OPNAV Manual 5215.1 of May 2016.

  
J.M. LLOYD  
By direction

Releasability and distribution:

This instruction is cleared for public release and is available electronically only via the NAVSEA Public Website located at <http://www.navsea.navy.mil/Resources/Instructions/>



LIST OF REFERENCES

- Ref: (a) OPNAVINST 2400.20G, Electromagnetic Environmental Effects and Spectrum Supportability Policy and Procedures, of 7 January 2021
- (b) Navy Telecommunication Procedures (NTP) 6F, Navy Electromagnetic Spectrum Guide, of 1 March 2018
- (c) SECNAVINST 2400.1B, Electromagnetic Spectrum Policy and Management, of 20 May 2019
- (d) DoD Instruction 3222.03, DoD Electromagnetic Environmental Effects Program, of 25 August 2014
- (e) DoD Instruction 4650.01, Policy and Procedures for Management and Use of the Electromagnetic Spectrum, of 9 January 2009
- (f) SECNAVINST 2400.2B, Electromagnetic Environmental Effects and Space Weather Event Preparedness Policy and Management, of 9 September 2022
- (g) MIL-STD-461G, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment, of 11 December 2015
- (h) MIL-STD-464D, Electromagnetic Environmental Effects Requirements for Systems, of 24 December 2020
- (i) MIL-STD-1310H, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility, Electromagnetic Pulse (EMP) Mitigation, and Safety, of 17 September 2009
- (j) DOD-STD-1399-070-1, Interface Standard for Shipboard Systems Section 070 Part 1 D.C. Magnetic Field Environment (Metric), of 30 November 1989
- (k) MIL-STD-1605A, Procedures for Conducting a Shipboard Electromagnetic Interference (EMI) Survey (Surface Ships), of 8 October 2009
- (l) MIL-STD-2169D, High-Altitude Electromagnetic Pulse (HEMP) Environment, of 09 March 2021
- (m) MIL-STD-4023, High-Altitude Electromagnetic Pulse (HEMP) Protection for Military Surface Ships, of 25 January 2016
- (n) COMFLTFORCOMINST 4790.3D, Joint Fleet Maintenance Manual, of 15 January 2021
- (o) OPNAV M-5100.23, Navy Safety and Occupational Health Manual, of 5 June 2020
- (p) National Telecommunications and Information Administration “Manual of Regulations and Procedures for Federal Radio Frequency Management”, of September 2017