OPNAV INSTRUCTION 9420.2A

From: Chief of Naval Operations

Subj: NAVY ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM POLICY AND STANDARDS

Ref: (a) CNO ltr Ser N00/8U5000076 of 17 March 1998 (NOTAL)
(b) CNO Executive Board (CEB) Decision Memorandum of 27 November 2000, Navigator of the Navy CEB (NOTAL)
(c) NATO STANAG 4564
(d) SECNAVINST 5000.2E
(e) International Maritime Organization Resolution MSC.232(82), Revised Performance Standards for ECDIS
(f) NAVSEAINST 9420.4A (NOTAL)
(g) DASN Ships Memorandum to Program Executive Office, Integrated Warfare Systems (PEO IWS), Electronic Chart Display Information Systems-Navy (ECDIS-N) as an Acquisition Program Under PEO IWS, 24 January 2012 (NOTAL)

Encl: (1) Navy Vessel Certification for Unrestricted Operations Two Phase Process

1. Purpose

   a. To provide Navy policy and guidance governing the implementation and operational use of the Navy Electronic Chart Display Information System (ECDIS).

   b. To direct and guide the Navy’s transition from paper nautical charts to an electronic charting environment for primary navigation and piloting.

   c. To establish the minimum performance standards and the certification process for Navy ECDIS.

   d. To assign responsibilities to specific Navy organizations for requirements development, acquisition, installation, testing, certification, training and sustainment of Navy ECDIS.
e. This revision establishes policy, updates responsibilities, more clearly articulates core functions, and delineates relationships to certain Navy organizations related to the implementation of Navy ECDIS. This instruction is a major revision and should be reviewed in its entirety.

2. **Cancellation.** OPNAVINST 9420.2.

3. **Scope.** This policy applies to all U.S. Navy commissioned vessels, non-commissioned vessels (e.g., United States naval ships, expeditionary vessels, and watercraft), and organizations that support the development, acquisition, testing, installation, training, certification, operation, and sustainment of Navy ECDIS.

4. **Background**

   a. Per references (a) and (b), the ECDIS capability has been implemented on the majority of U.S. Navy ships and submarines. A revision to the current Navy ECDIS guidance is warranted to capitalize on the lessons learned from almost a decade of ECDIS implementation, exploit advancements in ECDIS technology, standardize ECDIS acquisition across the fleet, and maintain interoperability with allied navies.

   b. The proliferation of numerous hardware and software versions of the ECDIS capability in the fleet has led to significant training and sustainment challenges.

   c. The need to establish a formal acquisition program of record (POR), with the appropriate Joint Capabilities Integration and Development System requirements documentation, is imperative to standardize implementation of the next generation of Navy ECDIS across the fleet. Furthermore, ECDIS now has the ability to do more than just traditional navigation. They also provide the capability to process and display specific military information (e.g., mine-like contacts, submarine transit lanes, Q-routes, etc.) and other auxiliary navigation information that may be used where core navigation information is not available. Many allied navies either possess, or are in the process of attaining the capabilities defined in reference (c).
5. **Policy**

   a. All commissioned Navy ships and submarines, except those excluded because of planned decommissioning, shall transition to an approved Navy ECDIS as the primary navigation plot.

   b. The follow-on Navy ECDIS POR shall be developed, executed, and managed per reference (d) and provided to the fleet as government-furnished equipment.

   c. All legacy ECDIS configuration approvals and certifications completed under the provisions of this instruction shall remain in effect until the legacy ECDIS configuration is transitioned to the Navy ECDIS POR.

   d. Navy commissioned vessels are exempt from certain aspects of the International Convention for the Safety of Life At Sea and are generally not required to operate with an International Maritime Organization (IMO) compliant ECDIS. However, the general requirements for safe navigation apply to all vessels, including military vessels. To set standards in keeping with safe navigation, the Navy will observe international standards wherever possible.

   e. Minimum performance standards for Navy ECDIS:

      (1) ECDIS performance standards identified in reference (e).

      (2) Warship ECDIS software performance standards identified in annex A of reference (c).

      (3) Process and display electronic navigational charts (ENC) in the International Hydrographic Organization (IHO) standards for the S-57 and S-100 data format series (when available).

      (4) Process and display vector product format (VPF) electronic charts and data from the National Geospatial-Intelligence Agency (NGA) (e.g., digital nautical chart (DNC), tactical ocean data (TOD), VPF database update and the geospatial symbols for digital displays).
(5) Process, display, transfer, and interrogate additional military layers containing specific military information (e.g., mine-like contacts, water space management, Q-routes, dive navigation, etc.).

(6) Accept and display radar, visual and other navigation fix information (e.g., signals of opportunity, long-range navigation, etc.).

(7) An independent backup ECDIS, as approved by the Office of the Chief of Naval Operations (OPNAV), Navigator of the Navy (N2/N6E), shall be provided to ensure safe navigation in the event of primary ECDIS failure.

(8) The Navy ECDIS shall provide the capability to display, process, and store classified data on all consoles commensurate with the mission security requirements of the host vessel.

f. All electronic charting systems installed on commissioned Navy vessels after the effective date of this policy shall meet the minimum performance standards and use the approved Navy ECDIS POR, or shall receive a waiver from OPNAV N2/N6E for each affected platform or platform class. Waiver requests shall be submitted to the Navy ECDIS Integrated Product Team (IPT) with reasons for non-compliance and an executable plan to become compliant.

g. New construction vessels shall be delivered with the approved Navy ECDIS POR that meets the performance standards in subparagraph 5e.

h. Military Sealift Command (MSC) government-owned ships will transition to an ECDIS that is IMO compliant for performance standards established for civil shipping per reference (d). Additionally, ECDIS aboard MSC ships not assigned to Commander, U.S. Transportation Command shall also meet the minimum performance standard for display of VPF electronic charts and data from NGA found in subparagraph 5e(4).

i. Electronic chart systems acquired for naval expeditionary vessels and watercraft are not required to meet
the Navy ECDIS performance standards identified in subparagraph 5e, but shall be capable of processing and displaying both ENC and DNC products.

6. Action

   a. OPNAV N2/N6E shall establish and chair the Navy ECDIS IPT, which shall be comprised of representatives from the OPNAV platform resource sponsor; Commander, Operational Test and Evaluation Force (COMOPTEVFOR); Commander, Naval Sea Systems Command (COMNAVSEASYSCOM) Program Executive Office, Integrated Warfare Systems (PEO IWS) Program Office; COMNAVSEASYSCOM navigation systems technical warrant holder; Commander, U.S. Fleet Forces (COMUSFLTFORCOM); and platform type commander (TYCOM). The purpose of the IPT is to:

      (1) Review and approve the test strategy for candidate Navy ECDIS configuration(s).

      (2) Review Navy ECDIS configuration test results and make recommendation to OPNAV N2/N6E for Navy ECDIS configuration approval.

      (3) Review Navy ECDIS waiver requests and make recommendations to OPNAV N2/N6E.

   b. If Navy ECDIS is being delivered as part of an acquisition program requiring testing per reference (e), the acquisition program manager is responsible for incorporating the Navy ECDIS certification requirements into the program’s delivery schedule and test planning processes.

   c. To certify a Navy vessel for unrestricted operations using a Navy ECDIS as the primary navigation plot, candidate configurations must successfully complete the two phase process described in enclosure(1).

   d. Changes to approved Navy ECDIS baseline configurations are required to be re-approved if determined by the Navy ECDIS IPT that these changes impact the ability of the platform to safely navigate. ECDIS baseline configuration changes consist of any major upgrade or major modification of equipment that interfaces with the Navy ECDIS. Equipment interfaces considered part of the ECDIS baseline configuration are, but not limited
to, positioning, navigation, and timing distribution systems; global positioning satellite receivers; inertial navigation systems; gyrocompass; speed sensor; fathometer; connected radio detection and ranging; ECDIS software; and or ECDIS hardware. Proposed changes shall be forwarded to the ECDIS IPT for consideration prior to installation. The ECDIS IPT shall issue updated certification documentation upon approval of an ECDIS baseline configuration change.

7. Responsibilities. Specific commands and agencies shall execute their duties as described below:

a. OPNAV N2/N6E

(1) Collect, review, submit, and update Navy ECDIS requirements for validation per reference (d). Requirements shall reflect the minimum performance standards of this instruction in conjunction with fleet identified capability gaps.

(2) Resource the development, integration, and testing of the Navy ECDIS capability on surface platforms per reference (f).

(3) Establish electronic navigation policy and minimum performance standards for Navy ECDIS.

(4) Approve or disapprove operational use of Navy ECDIS configuration(s) based on review of test results and recommendations provided by the Navy ECDIS IPT. Also, serve as the waiver approval authority for candidate Navy ECDIS configuration(s) not fully compliant with this instruction.

(5) Serve as the primary U.S. Navy liaison to NGA for safety of navigation products and services required to support Navy ECDIS.

(6) Coordinate joint, interagency, and international data standards to ensure Navy ECDIS compatibility and interoperability.

(7) Convene and chair the Navy ECDIS IPT.
(8) Maintain the currency of the Navy ECDIS policy, performance standards, and certification processes outlined in this instruction.

b. **Designated OPNAV Platform Resource Sponsor**

   (1) Resource the procurement, certification, training, sustainment and modernization of Navy ECDIS POR for vessels under their cognizance. Modernization includes the requirement to periodically update Navy ECDIS hardware, software, and interfaces to new navigation sensors to process and display the latest IHO format standards.

   (2) Resource the research, development, and testing per approved ECDIS requirements documentation for submarine platforms.

   (3) Provide representative(s) to the Navy ECDIS IPT.

   (4) Ensure new construction ship programs acquire and install OPNAV-approved Navy ECDIS software.

c. **COMUSFLTFORCOM and Commander, Pacific Fleet** (or their designated TYCOM representatives)

   (1) Authorize the use of an OPNAV-approved Navy ECDIS as the primary navigation plot on a commissioned ship or submarine based upon:

      (a) Installation of an approved Navy ECDIS configuration.

      (b) Successful completion of a navigation certification (NAVCERT) per reference (f).

      (c) Successful completion of a Navy ECDIS crew certification that verifies personnel operating the Navy ECDIS can safely navigate the vessel per current navigation policy, doctrine, and standard operating procedures.

   (2) Determine if the Navy ECDIS POR correctly and adequately supports the fleet navigation mission. If capability
gaps are identified, consolidate new requirements and forward to OPNAV N2/N6E for inclusion into the Navy ECDIS requirements documents.

d. PEO IWS Program Office

(1) Ensure the minimum Navy ECDIS performance standards of this instruction are incorporated into the approved Navy ECDIS POR acquisition documentation and addressed in the operational test (OT) milestones required by reference (e).

(2) Maintain Navy ECDIS POR per the guidance outlined in reference (g) for development, acquisition, and sustainment of the Navy ECDIS program.

(3) Determine the minimum hardware requirements for successful operation of approved Navy ECDIS software version(s).

(4) Coordinate with designated OPNAV platform resource sponsor and the fleet to minimize the number of Navy ECDIS baseline software versions fielded to maximize user interoperability, reduce training requirements, and facilitate configuration control.

(5) Coordinate with COMNAVSEASYSCOM Integrated Warfare Systems Engineering Group (SEA 05H) to perform a NAVCERT on approved Navy ECDIS configurations per reference (f).

(6) Provide a representative for, and responsible to, the Navy IPT to formulate and distribute the recommended test strategy for candidate Navy ECDIS configurations requesting approval.

(7) Provide to the Navy ECDIS IPT a software element certification letter for hardware and software configurations based on the PEO IWS-approved element certification plan.

(8) Provide to OPNAV N2/N6E waiver approval or disapproval recommendation for candidate Navy ECDIS configurations not fully compliant with this instruction.
e. **Ship Acquisition Program Managers Delivering Navy ECDIS**

(1) Coordinate with PEO IWS to ensure timely delivery, integration and testing of OPNAV-approved Navy ECDIS software.

(2) Incorporate the Navy ECDIS certification requirements into the ship acquisition program’s delivery schedule and test planning processes as required by this instruction and reference (e).

(3) Coordinate with COMNAVSEASYSCOM (SEA 05H) to ensure that a NAVCERT is conducted on candidate Navy ECDIS configurations per reference (f).

(4) Provide representative(s) to the Navy ECDIS IPT.

f. **NGA**

(1) Establish VPF specifications and provide VPF products including the related test data set (i.e., DNC, TOD, VPF data update, and geospatial symbols for digital displays).

(2) Migrate legacy VPF-based products to new IHO S10x product specifications as defined in the S100 universal hydrographic data model (e.g., S101, S102...).

(3) Develop and maintain S10x testbed software to validate new and emerging S10x data products prior to release to Navy.

g. **COMOPTEVFOR**

(1) If the Navy ECDIS capability is being delivered as part of an acquisition program requiring testing per reference (e), ensure requirements of this instruction are properly taken into account during test planning, execution, and reporting.

(2) Provide a testing recommendation for candidate Navy ECDIS configuration(s) to the Navy ECDIS IPT. In cases where OT is warranted, determine the level of OT necessary to sufficiently test for operational effectiveness and suitability of the Navy ECDIS being installed on the host navigation configuration.
(3) When properly resourced and scheduled, evaluate candidate Navy ECDIS configuration(s). Except for testing that supports an interim approval decision, a recommendation to OPNAV N2/N6E regarding configuration approval as a Navy ECDIS shall be included in the final test results. Results of testing conducted in support of an interim approval will include a risk assessment regarding the use of the unapproved configuration until the OT required to support an approval recommendation can be completed.

(4) Provide a representative to serve on the Navy ECDIS IPT.

h. Commander, MSC. Establish an acquisition and certification program to transition all government-owned ships supporting Navy missions from paper nautical charts to an IMO compliant ECDIS as the primary navigation plot.

i. COMNAVSEASYSCOM (SEA 05). Oversee the overall navigation system certification process. The navigation systems – ships technical warrant holder will provide a representative to the Navy ECDIS IPT.

8. Records Management. Records created as a result of this instruction, regardless of media and format, shall be managed per Secretary of the Navy Manual 5210.1 of January 2012.

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NAVY VESSEL CERTIFICATION FOR UNRESTRICTED OPERATIONS

TWO PHASE PROCESS

1. Phase I (blocks 1 through 4). Describes the process required to test, evaluate and approve the Navy ECDIS configuration for the intended host platform(s).

   a. Block 1. At the beginning of phase I (Navy ECDIS configuration approval), candidate Navy ECDIS configuration(s) will be identified to OPNAV N2/N6E by the OPNAV platform resource sponsor. Configuration(s) will be identified by ship class or submarine class; installed navigation equipment (controls and sensors, navigation data distribution, and electronic charting processing and display); power distribution; electronic charting software; and ship control application planned for installation.

   b. Block 2. OPNAV N2/N6E shall convene a Navy ECDIS IPT for each candidate Navy ECDIS configuration. At least 1 month prior to convening the IPT, members will be provided the necessary information from the requesting organization to formulate a recommended test strategy. Information shall include, at a minimum, a description of the unapproved configuration; relevant test history; proposed test strategy; and concept of operations describing the Navy ECDIS hardware and software configuration and system architecture. Test strategy shall ensure configuration is adequate to support robustness, survivability, and the environmental qualifications commensurate with platform requirements to accomplish ship’s mission(s). Additionally, test strategy should consider the manpower, personnel, training, maintenance, and logistic infrastructure available to support this plan. Each member of the Navy ECDIS IPT shall review the documentation and recommendations for the Navy ECDIS candidate configuration to determine if additional testing NAVCERT assessment, COMOPTEVFOR, etc.) is required; or provide concurrence on presented test approach to obtain configuration approval; or provide justification for deviation from briefed proposals.

   c. Block 3. Each member of the Navy ECDIS IPT shall review the documentation and provide a recommendation for configuration approval. Following consensus by the ECDIS IPT, recommendation for or against configuration approval, along with any requests for deviations, shall be forwarded to OPNAV N2/N6E for
consideration. If concurrence on the implementation details of the selected option cannot be achieved, OPNAV N2/N6E will make a decision on the issues for which the IPT members cannot reach agreement. In the event an OT is part of the recommended test strategy, COMOPTEVFOR will specify the testing required to assess the operational effectiveness and operational suitability of the candidate Navy ECDIS configuration.

d. **Block 4.** OPNAV N2/N6E shall review the recommendation(s) and issue a message approving the Navy ECDIS configuration, or direct corrective action and additional testing as appropriate.

2. **Phase II (blocks 5 through 8).** Lists the systems command and fleet processes required to properly install, test, certify, and ultimately authorize the ship to navigate solely using the Navy ECDIS configuration.

   a. **Block 5.** At the beginning of phase II (shipboard ECDIS and crew certification), each approved Navy ECDIS configuration installed aboard a ship or submarine shall complete a system operational verification test per COMNAVSEASYSCOM technical specifications. System operational verification test ensures system hardware and software work properly and that interface data is received into the system in the proper format.

   b. **Block 6.** To ensure system hardware, software, and interfaces work properly in the new configuration, a NAVCERT shall be conducted per reference (f).

   c. **Block 7.** After installation of an approved configuration, and completion of the NAVCERT, individual ships and submarines must successfully complete a Navy ECDIS crew certification, per guidance issued by the respective fleet commander and TYCOM.

   d. **Block 8.** Upon successful completion of the Navy ECDIS crew certification, the TYCOM will authorize the ship or submarine for unrestricted navigation operations using Navy ECDIS as the primary official navigation plot.
Block 1: Candidate Navy ECDIS Configuration(s)

Block 2: Navy ECDIS IPT Identify testing required to support configuration approval recommendation

Block 3: Navy ECDIS IPT recommendation for configuration approval

Block 4: Navigator of the Navy (N2N6E) approval of Navy ECDIS configuration.

Block 5: Installation or system operational verification test of OPNAV approved Navy ECDIS configuration

Block 6: Successful completion of NAVCERT

Block 7: Successful Navy ECDIS crew certification

Block 8: TYCOM authorization for unrestricted Navy ECDIS operations