

**SURFACE SHIP NAVIGATION
DEPARTMENT ORGANIZATION
AND REGULATIONS MANUAL**



DEPARTMENT OF THE NAVY
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COMNAVSURFPAC/COMNAVAIRPAC/COMNAVAIRLANT/COMNAVSURFLANT
INSTRUCTION 3530.4F

Subj: SURFACE SHIP NAVIGATION DEPARTMENT ORGANIZATION AND REGULATIONS
MANUAL

Ref: See Appendix L

1. Purpose. To publish Type Commander (TYCOM) minimum navigation policies, procedures, and organizational standards to be implemented by Commander, Naval Surface Force, U.S. Pacific Fleet (COMNAVSURFPAC), Commander, Naval Air Force, U.S. Pacific Fleet (COMNAVAIRPAC), Commander, Naval Air Force Atlantic (COMNAVAIRLANT), and Commander, Naval Surface Force Atlantic (COMNAVSURFLANT) vessels.
2. Cancellation. COMNAVSURFPAC/COMNAVAIRPAC/COMNAVAIRLANT/
COMNAVSURFLANT INSTRUCTION 3530.4E.
3. Scope. This instruction applies to all COMNAVSURFPAC, COMNAVSURFLANT,
COMNAVAIRPAC and COMNAVAIRLANT ships and craft (CG, CVN, DDG 51, DDG 1000, LCC,
LCS, LHA, LHD, LPD, LSD, MCM, PC, LCU, LCAC, and INLS). This directive is a complete revision
and should be reviewed in its entirety.
4. Action.
 - a. Effective upon receipt, personnel assigned responsibility for navigation duties, including those assigned in the Pilothouse (Bridge), Combat Information Center (CIC)--also used in this manual to denote Combat Direction Center (CDC), Integrated Combat Center (ICC), Mission Control Center (MCC), Ship Mission Center (SMC), or Tactical Operations Plot (TOP), depending on platform--and Engineering, including Aft Steering and Casualty Response teams, are required to read and demonstrate knowledge of the contents of this instruction before assuming their duties. Additionally, watch standers charged with navigation duties must review this document and the ship's Navigation Bill quarterly and acknowledge their review on a ship-generated form.
 - b. Commanders and Commanding Officers are required to become thoroughly familiar with this manual, especially in training and equipping their Navigation Team with the knowledge and skills on the accuracy and use of all available methods for determining position in order to keep the ship from grounding, collision, and allision.


10 Aug 18

c. Immediate Superiors in Command (i.e., Squadron and Group Staffs) are required to conduct Navigation Assessments when the Navigation Assessment criteria is met per Appendix A for COMNAVSURFPAC and COMNAVSURFLANT ships, and once per Fleet Readiness Training Plan (FRTTP) per reference (a) for COMNAVAIRPAC and COMNAVAIRLANT ships. Consolidated and sanitized reports of common deficiencies discovered during navigation assessments will be forwarded to the appropriate TYCOM using Appendix A, Squadron/Group Staff Navigation Assessment Checklist. The Navigation assessment will also be reported as an exercise in Training Reports (TRAREPs), Carrier Sierra Hotel Aviation Readiness Program (CV-SHARP), and Training and Operational Readiness Information Services (TORIS) or Training Figure of Merit (TFOM). A ship that fails the Squadron or Group Staff Navigation Assessment, or one with its assessment out of periodicity, requires direct supervision of the Navigation Team by their ISIC until a Navigation Assessment is successfully completed. Guidelines are provided in Appendix A.

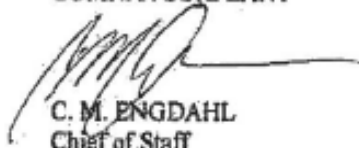
d. Each Commanding Officer (CO) will tailor chapters two through five of this instruction (plus Appendices C, H, I, and J, as applicable) as necessary to adapt them to the ship's navigation sensors and data distribution system configuration and organization, and status of transition to electronic charting. The resulting instruction will be issued as the ship's Navigation Bill and will be considered current until 90 days following change of command, or superseded, whichever comes first. Commander, Littoral Combat Ship Squadron ONE (COMLCSRON ONE) and Commander, Littoral Combat Ship Squadron TWO (COMLCSRON TWO) will issue Navigation Bills for each LCS hull under their cognizance as outlined above for Electronic Chart Display Information System – Navy (ECDIS-N) authorized ships.

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


6. Review and Effective Date. Per OPNAVINST 5215.17A, COMNAVSURFPAC will review this instruction annually on the anniversary of its effective date to ensure applicability, currency, and consistency with Federal, DoD, SECNAV, and Navy policy and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will automatically expire 5 years after effective date unless reissued or canceled prior to 5-year anniversary date, or an extension has been granted.




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CHAPTER 1
INTRODUCTION

1. Background.

a. Technological advances have changed the ways to display charts and plot ship's position; however, the fundamentals of safe navigation have remained unchanged. As such, no specific technological advances or set of rules can be created that can keep the ship safe in all possible conditions. Ship safety is assured only through good judgment applied to the specifics of each situation. The navigator (e.g., the ship's navigator and the officer of the deck (OOD)) remains constantly alert, continuously questions position information and the reliability of the chart, and anticipates danger before it arises. The navigator not only knows the current situation and its uncertainties, but thinks ahead. A navigator should utilize all of their resources. The Navigation team's relationship with one another is a prime factor in overall mission success. The Bridge working with the CIC team is essential to enabling the ship to achieving any assigned warfighting mission.

b. Watch standers responsible for the safe navigation of the ship must remain mindful that while special significance must always be placed on piloting in restricted waters, the establishment of Over-the-Horizon Targeting (OTH-T), increasing use of Direct Support (DS) operations, and routine rendezvousing under Emission Control (EMCON) conditions have caused increased emphasis to be placed on positioning, navigation, and timing (PNT). Studies have shown that navigation accuracy can be adversely affected by a number of factors, including:

- (1) Accumulation of errors in information flow.
- (2) Lack of proper emphasis on navigation accuracy.
- (3) Improper determination of set and drift and failure to properly apply set and drift to Dead Reckoned positions.
- (4) Improperly calibrated electromagnetic (EM) log and inaccurate or improper azimuth reference.
- (5) Lack of user knowledge regarding the capabilities and limitations of Global Positioning System (GPS) positional data.
- (6) Lack of awareness of the limitations and requirements of electronic charting systems used for situational awareness.
- (7) Lack of compliance with established navigational procedures.
- (8) Not properly following Combat System Operational Sequencing System (CSOSS) procedures when initializing and aligning navigation systems.

c. Going to sea in ships is inherently dangerous. In light of recent incidents, every officer and enlisted crewmember must make a renewed emphasis on sound decision making, braking error chains, identifying operational risk and focusing on safety. There is nothing short of actual combat operations

that warrants a Captain or Navigator putting a ship in danger. Each ship should always operate based on sound principles and the best navigation and seamanship practices. Simply put, every member of the crew, regardless of seniority level or navigational experience, is expected to “call out” any other crewmember, up to and including the captain, any time someone feels that something is wrong. Every ship must continue to foster a culture supporting integrity, formality, questioning attitude, level of knowledge, procedural compliance, and forceful backup.

2. Navigation Team Organization. The CO must organize the Navigation Team so it is competent and flexible enough to meet the demands and complexities of the ship's missions. Specifics on organization, duties and responsibilities are set forth in Chapter 2. All personnel with duties relating to navigation must know and understand this instruction. Recent incidents are reminders that any moment at sea has the potential to be a critical moment requiring confident and decisive action. A navigation team that is well trained, educated and qualified is a team that knows their ship and its capabilities. Every command must take every opportunity to evaluate how it is executing core competencies, and improve at every turn. Navigation is among these core competencies. CO's are expected to have the level of personal involvement and fortitude necessary to achieve and sustain these standards, and continually re-evaluate navigational proficiency.

3. Hostile or Uncertain Environment. Surface Forces must be prepared to operate in a Global Positioning System - Positioning, Navigation, and Timing (GPS-PNT) degraded or denied environment. This includes preparation for, recognition of, and implementation of mitigations to intentional or unintentional GPS-PNT interference. Therefore, the Navigation Team is faced with additional duties when higher conditions of readiness are required.

a. Before entering a GPS-PNT denied or degraded environment, the most significant action that can be taken by ships is to ensure that all GPS receivers have their cryptologic material keyed, and that the crypto is updated at the regularly scheduled intervals. Only military receivers are capable of accessing the encrypted signals.

b. The Navigation Team must provide the CO and Tactical Action Officer (TAO) with timely geodetic positioning data, as this data may be required to position the ship, acquire targets and employ all required weapons and tactics while fighting the ship. The ship's Battle Orders or Navigation Bill will describe procedures to ensure the Navigator's and the Navigation Team's role in tactical situations are clearly defined. Additional scrutiny by bridge watch standers in a possible GPS denied environment may indicate the type of spoofing and provide early warning to protect other tactical systems. The bridge must monitor for figure of merit (FOM) accuracy, position or time jitter, and loss of GPS. If the bridge is equipped with a commercial GPS, these units can be the first indicators of jamming or spoofing, displaying false indications for position, velocity, or time. Spoofing presents a unique challenge as operators may not receive any indications that the system is affected until significant impacts have already occurred. There may be noticeable signal changes when shifting between jamming and spoofing, recognizable by change in amplitude or bandwidth of the signal. The signal is strongest during denial jamming with a variety of possible waveforms. The signal strength for spoofing modes tends to be lower power. An indication of spoofing can include speed discrepancies between GPS and onboard indicators.

c. Numerous current operations show that position data supplied automatically from GPS Precise Positioning Service (PPS) results in the most geodetically accurate data. However, the Navigator must constantly compare GPS positions to fix information obtained from all other military GPS (PPS), RADAR ranges, and visual bearings, and take positive action to de-select or mark as unusable any data source determined to be less accurate than his or her Navigation Team's required positional accuracy. Tactics, Techniques, and Procedures (TTP) will describe the ship's requirements to operate in a GPS degraded or denied environment. Refer to the GPS-PNT Fleet Advisory, reference (b), for more information.

4. Training. Maintaining proficiency of basic navigation skills through training and practicums is critical to safe navigation. Additionally, a thorough understanding of principles of operation, equipment use (Automatic Identification System (AIS), RADAR, Automated RADAR Plotting Aid (ARPA), GPS, etc.), and limitations of installed equipment is also essential to safe navigation. Unit training must provide for accurate assessment as well as the necessary training to educate, qualify, evaluate and periodically re-qualify assigned personnel. Reference (c) outlines the requirements for navigation team simulator training. Appendix F details some of the resources available to assist Navigators and Training Officers in developing a training curriculum. As ships are preparing to execute special evolutions, it is recommended that applicable lessons learned and discussion points, including mishap reviews (e.g., ANTIETAM and GUARDIAN groundings, PORTER, FITZGERALD, and JOHN S. MCCAIN collisions, etc.) are gathered and briefed so that watch standers can understand the challenges or unique factors associated with conducting special evolutions.

a. Mandatory requalification is required for all watch stations (Bridge, CIC, Engineering) when:

(1) Arriving at a new sea command, to include both Permanent Change of Station (PCS) and Temporary Additional Duty (TAD) orders.

(2) Documented deficiencies have resulted in disqualification from a particular watch station.

(3) Equipment, system configurations, or task requirements change that requires modification to standard or tailored Personnel Qualifications Standard (PQS).

(4) Revised PQS is received and the CO determines the changes are applicable to the ships watch stations.

(5) Any other circumstances outlined in reference (d).

b. International and Inland Navigation Rules and Regulations Exam

(1) Navigators must administer monthly 20-question Rules of the Road exams per reference (e) to, at a minimum, all qualified Officers of the Deck (OODs), Junior Officers of the Deck (JOODs), Conning Officers (CONNs), Tactical Action Officers (TAOs), Combat Information Center Watch Officers (CICWOs), Surface Warfare Coordinators (SUWCs), Shipping Officers, Piloting Officers, Senior QM and OS, Assistant Navigator (ANAV), Quartermasters of the Watch (QMOW), and Small Boat Officers.

(2) Copies of completed exams must be retained on board for 12 months.

(3) Navigators must remediate any watch stander who scores below a 90 percent within 7 days.

c. RADAR Navigation (RADNAV). All non-ECDIS-N ships will continue to attend the RADAR Navigation Team Refresher Course (J-221-0344). Additionally, upgrades to the curriculum and classrooms are in progress to bring this capability online for ECDIS-N certified ships in the near future starting in FY21. CNSF/CNAF will execute a phased approach as each learning center is upgraded and each TYCOM will determine when each fleet concentration area (FCA) will implement the RADNAV Team Refresher Course as a part of MOB-N certification. CANTRAC will reflect which sites have ECDIS-N capability.

(1) The Navigation Team, including, at a minimum, the Navigator, ANAV, Senior QM, Senior OS, CIC Officer (CICO), Piloting Officer, Shipping Officer, Navigation Radar Operators, VMS Operators, CIC Navigation Plotter, Bearing Book Recorders, CIC Navigation Log Recorder and any other personnel the CO designates must complete RADNAV Team Refresher Course. COs are required to attend the final day of training.

(2) RADNAV Team Refresher Course completion will be validated during NAV Assessments. Ships are encouraged to complete the COI prior to the first underway from Contractor Sea Trials; however, if capacity throughput prevents this from occurring, the ship may complete the COI at any point prior to the MOB-N certification.

(3) Pre-commissioning units will complete this requirement prior to Sail Away per reference (f).

(4) This requirement is not applicable to LCS class ships.

d. Navigation Seamanship and Ship-handling Training (NSST) Program. The NSST is a state-of-the-art bridge simulator used to train ship crews in navigation and ship-handling using virtual technology. It closely replicates specific ship class ship handling characteristics in different environmental conditions in an effort to improve basic and advanced skills in a synthetic environment that replicates the real world. The NSST facilities are located in each of the Fleet Concentration Areas (FCA). Refer to reference (c) for further information. Courses offered include:

(1) Bridge Resource Management (BRM). BRM is the effective management and utilization of all resources, human and technical, available to the bridge team, to ensure safe navigation. In essence, BRM is the process and practice of using all available information and assistance to ensure that ship's navigation teams make the best possible decisions, and that those inevitable human errors are identified and mitigated before they can cause any harm. The main focus of the BRM course is to change crew attitudes by establishing a safer and more efficient teamwork onboard ships. It aims to create team leaders and team members by addressing issues related to leadership, management styles, culture, communication, automation, stress and fatigue, etc.

(2) Special Evolutions Training (SET). SET affords ships the opportunity to train in evolutions the CO believes will be of the most benefit to the watch team. SET modules are organized in 4-hour sessions comprised of approximately 45 minutes of instruction, followed by 3 hours in the simulator. Ships select from a list of special evolution topics found on the NSST Web site, accessible via the TYCOM's portal Web site. A subset of SET is the Basic Ship-Handling Course (BSH), designed for newly commissioned and novice bridge watch standers but can also be tailored for more experienced

ship-handlers. The focus is “hands-on” elementary evolution training. It also includes classroom lectures on basic ship-handling techniques.

5. Transition to Electronic Charting. The CNO-directed transition from paper standard nautical charts (SNC) to the use of electronic charts continues to move forward. The National Geospatial-Intelligence Agency (NGA) has delivered a world-wide set of Digital Nautical Charts (DNC) certified ‘Safe for Navigation’ and is in the early stages of a transition from the DNC in the Vector Product Format (VPF) to the more widely accepted ENC format defined by the International Hydrographic Organization (IHO) S-57 Standard and to the new S-100 Standard when it is eventually finalized by the IHO. Policy regarding the use of DNC and ENC is captured in reference (g). Fleet-wide installation of OPNAV-approved electronic charting systems (e.g., ECDIS-N) will be completed in FY-19. Newer versions of ECDIS-N starting with VMS 9.1 can utilize both DNC (VPF) and ENC (S-57) libraries simultaneously. Older versions such as VMS 7.7 through VMS 8.3.4 require a manual reboot. See Appendix I for additional guidance.

a. Once a ship is authorized by the TYCOM to navigate with ECDIS-N as the primary plot, the authorization is required to be maintained for the life of the ship. Per references (h) and (i), ships (with the exception of LCS and ZUMWALT class ships) will still be required to carry some paper nautical charts. However, for ECDIS-N certified ships, the use of paper nautical charts as the primary means of navigation is no longer authorized. On ships equipped with an Emergency Navigation Laptop (ENL), the ENL will serve as the primary back-up to the ECDIS-N. Some special mission paper charts, such as the Littoral Planning Chart (LPC) used for amphibious operations and Naval Surface Fires Support (NSFS), are still required as there is no equivalent digital product.

b. All ships will continue to use military GPS (PPS) receivers, which must always be ‘keyed’ (cryptographic key loaded) per reference (j) as their primary fix source in all waters. For any issues with cryptographic key, the Electronic Material Officer (EMO) will coordinate with the ship’s Electronic Key Management System (EKMS)/Key Management Infrastructure (KMI) Manager for resolution. This does not preclude the navigation team from ascertaining the ship’s position by other means (i.e., visual, RADAR, INS, celestial and other secondary fix sources) as required. Every fix derived from the primary source (GPS) must be compared to a secondary fix source (i.e., visual, RADAR or Composite) at no greater than every third fix interval in restricted waters.

c. No one fix source should be solely relied upon. If GPS Figure of Merit (FOM) (see Table 3-B) or Estimated Position Error (EPE) exceeds those limits established in Table 3-A, the ship’s navigation team will shift to an alternate fix source as the primary fix source. GPS datum must be set according to the chart in use. DNC/ENCs are built to WGS-84 datum. Commercial GPS (e.g., FURUNO, GARMIN, etc.) may only be used as aids to maintain situational awareness. Use of commercial GPS is authorized only in emergencies, such as the failure of all military GPS (PPS) receivers (including the Defense Advanced GPS Receiver (DAGR)).

d. Shipboard testing of equipment and the associated Voyage Management System (VMS) electronic charting application has been conducted to verify it conforms to the ECDIS-N requirements identified in reference (k). Other electronic charting systems may be used only to enhance situational awareness.

CHAPTER 2
DUTIES AND RESPONSIBILITIES

1. Duties and Responsibilities. With respect to navigation, the following duties and responsibilities exist as stated in references (l) and (m), and as amplified below:

a. Immediate Superior in Command (ISIC). ISICs (i.e., Squadron or Group Staffs) are required to conduct Navigation Assessments when the Navigation Assessment criteria is met per Appendix A for CNSF ships or once per FRTP for CNAF ships. ISICs will:

(1) Serve as Senior Assessor. The Senior Assessor will be an officer that has successfully served as the CO of a surface ship.

(2) Appoint in writing a Navigation Assessor. The Navigation Assessor must:

(a) Have completed the Voyage Management System (VMS) Operator Course

(b) Have completed the VMS Train the Certifier (TTC) Course

(c) Rank and rating requirements:

1. For Officers: An officer who has successfully served as the Navigator of a surface ship.

2. For Quartermasters (QM): An E-6 and above QM who has successfully served as Senior QM of a surface ship (i.e. holds letter of designation as Senior QM from a previous tour on a surface ship). By the start of FY21, must be NEC W12A.

3. For Operation Specialists (OS): An E-6 and above OS, PQS-qualified as Shipping Officer, Piloting Officer, and Seamanship Training Team Member (STT). By the start of FY20, a graduate of Navigation Fundamentals (A-061-0200).

(3) Use Appendix A of this instruction for the assessment.

(4) Track, monitor, and periodically assess the training of each navigation team, to include simulator time in the NSST and Zumwalt Training Facility per reference (c), Littoral Combat Ship Training Facility (LTF) per reference (n), unit level training cycle events, and Readiness Evaluation (READ-E) events per reference (o). Note and address any trends.

(5) Augmentation should be done by ISIC (i.e., Squadron or Group Staffs) or TYCOM assessment team prior to the use of Afloat Training Group (ATG) Members. All personnel used to augment must meet the requirements outlined above, verified by the Senior Assessor.

(6) The Navigation assessment will be reported as an exercise in CV-SHARP or TORIS. A ship that fails the Squadron/Group Staff Navigation Assessment, or one with its assessment out of periodicity, requires direct supervision of the Navigation team by their Squadron/Group Staff, with the qualifications

noted above, until a Navigation Assessment is successfully completed. Guidelines are provided in Appendix A.

(7) For Forward Deployed Naval Forces – Japan (FDNF-J) surface ships, Commander, Naval Surface Group Western Pacific (COMNAVSURFGRU WESTPAC) is authorized to conduct the Navigation Assessment for ships under their administrative control (ADCON).

b. Commanding Officer (CO). The CO is responsible for the safe navigation of the ship. COs will use all available means of fixing and establishing the ship's position. Individual ship's Navigation Bills (NAVBILL) will delineate the Primary, Secondary and Tertiary means of fixing the ship's position, similar to Table 4-B and based upon the reliability of the ship's equipment. The CO will establish the proper role for the use of any Situational Awareness (SA) system installed on the ship and ensure that the SA system meets the requirements of this instruction. As stated in reference (1), "The presence of a pilot onboard will not relieve the CO or any subordinate from his or her responsibility for the proper performance of the duties with which he or she may be charged concerning the navigation and handling of the ship. The Commanding Officer is ultimately responsible for the training and performance of the navigation team." COs must be especially dutiful in maintaining the safety of the ship when evaluating the recommendations of an embarked pilot, especially when the pilot recommends deviations from the planned track and intentions (e.g., tug placement, line handling, etc.).

c. Executive Officer (XO). The XO will assist the Navigator and Navigation Team during all restricted water transits, unless otherwise directed by the CO. The XO will review planning with conformance standards and the navigation brief, and, on CNSF ships, the charts and route plans (e.g., Track Data Sheet, ECDIS-N Navigation Plan) for completeness as outlined in Appendices B and C.

d. Navigator (NAV). The Navigator will be designated in writing by the CO and is responsible, under the CO, for the safe navigation of the ship. The Navigator will receive all orders relating to their navigational duties directly from the CO and will make all reports in connection therewith directly to the CO. Additional duties of the Navigator include:

(1) Advising the CO, TAO (or CICWO when not manned), and OOD as to the ship's movements. To this end, NAV will:

(a) Maintain or cause to be maintained an accurate plot of the ship's position utilizing GPS, visual, RADAR, Inertial Navigation System (INS), celestial and other approved means. While underway, fixes from all military GPS (PPS), RADAR ranges, and visual bearings will be compared to determine fix uncertainty. When fix uncertainty is considered excessive per the CO's Standing Orders, the NAV will investigate and resolve the problem. Conditions permitting, the same procedure will be employed before entering restricted waters, including prior to getting underway.

(b) Establish a close liaison between CIC at and the Bridge for comparison of navigation information.

(c) Notify the CO, XO, OOD, and CONN immediately when the determination is made that the ship is standing into danger. Ensure this report is acknowledged, and make course and speed recommendations to prevent the ship from entering dangerous waters. Recommendations will be recorded in the Ship's Deck Log and/or Voyage Data Recorder (VDR).

(d) Give careful attention to the ship's course and speed and available depth of water when approaching land, shoals, and conducting amphibious well deck operations.

(e) Maintain records of all observations and computations made for navigating the ship, with results and dates included. Such records will form a part of the ship's official records.

(f) At the CO's discretion, report in writing to the CO, with copy to embarked staff, when underway, the ship's position at 0800, 1200, and 2000 each day and at such other times as the CO may require. Electronic reports via e-mail are authorized. If the CO does not require position reports, the 0800, 1200, and 2000 position reports will be logged in the Ship's Deck log and/or VDR.

(g) Procure, maintain and ensure adequate inventory control and destruction procedures for products listed in Appendix E as required and others required by the CO and higher authority.

(h) Review chart and publication requirements and assigned fleet allowance annually, or as new operating areas are assigned. Submit requests for changes to unit allowance to the TYCOM via the chain of command. Manage unit requisitions and subscription requirements as required to obtain all other geospatial products required to satisfy unit navigation requirements.

(i) Maintain at least one map account on file with the Defense Logistics Agency (DLA) Mapping Customer Operations (MCO) to receive the USFF/COMPACFLT geospatial product allowance material required by references (h) and (i), to manage unit subscription requirements and to requisition NGA products. Each map account must be verified annually in the DLA Mapping Enterprise Business System (MEBS). Access to MEBS is obtained via the DLA Account Management and Provisioning System (AMPS). Units should maintain two custodians for each map account at all times. See Chapter 3 paragraph 8 and Appendix E for additional information.

(j) Recommend to the CO which ready charts and publications (electronic or paper) are to be kept continuously up to date.

(k) Ensure corrections to the current edition of charts (paper or electronic) and publications are made and verified prior to use.

(l) Personally supervise navigation of the ship when the ship is in restricted waters or at battle stations, unless specifically designated by the CO to stand another watch or as required to sustain the crew's endurance standards. In this case, another officer or the Senior QM (if qualified and designated as the Assistant Navigator) qualified to serve as Navigator per table 2-A will be directed in writing by the CO to perform these duties.

1. In order to standardize safe navigation practices and document deficiencies while conducting restricted waters transits, the NAV should ensure that Seamanship Training Team (STT)/ Seamanship and Navigation Training Team (SNTT) is in place whenever manning and crew endurance standards permit. To this end, the senior QM, OS, or other designated member acting as STT/SNTT must observe all actions by the Navigation Team while in restricted waters, and document any notable item, including good and bad practices or procedures. All areas noted will be reviewed as soon as feasible after each evolution as part of the Plan, Brief, Execute, Debrief (PBED) process, as well as in a formal STT or

SNTT debrief. Additionally, these lessons learned must be added to future briefs for similar evolutions, and be retained for review during future Squadron, Group Staff, or ATG evaluations. For CNSF ships, document critiques of near misses and lessons learned via reports to the TYCOM when appropriate per references (p) and (q).

(m) Before entering restricted waters, study all available sources of information concerning navigation of the ship therein.

(n) Prior to anchoring, ensure the appropriate chart and electronic display showing the ship's anchorage position, water depth, bottom type, and all navigation aids to be used are identified to the OOD and CIC. Upon anchoring, plot the anchor's position, swing and drag circles. Determine if the anchor is holding by taking fixes frequently, at least every three minutes, for the first thirty minutes after anchoring (or according to ship's NAVBILL and/or CO's Standing Orders). Ensure comparison with swing and drag circles and the ship's position between all navigation plots. Compare all fix sources. Announce when the ship is out of position.

(o) Prepare the CO's Night Orders in such a format as prescribed by the CO. At a minimum, include operating areas, night steaming instructions, aids to navigation, and fix interval (if other than prescribed in the standing orders or NAVBILL).

(p) For nuclear-powered ships, verify the ship will moor or anchor at an approved berth or anchorage according to reference (r).

(q) For CNSF ships, ensure navigation and ship handling teams are prepared to conduct events per reference (o) utilizing the NSST, ZTF, or LTF (as applicable) per references (c) and (n), respectively.

(r) For CNAF ships, ensure navigation and ship handling teams are prepared to conduct events per reference (a).

(s) Advise the CO, OOD, CONN, and CIC (TAO or CICWO) of expected effects on the ship's maneuvering characteristics caused by casualties to the main propulsion or steering systems. To this end the Chief Engineer and Reactor Officer are responsible for keeping the Navigator informed as to the capabilities and limitations of such systems.

(t) Ensure the proper preparation, accurate entries, and timely submission of the Deck Log. The NAV will inspect daily, and more often when necessary, the Deck Log and take such corrective actions as may be necessary within his or her authority, and notify the CO of any discrepancies or actions taken.

(u) Ensure vessel is under correct AIG to receive all applicable Maritime Safety Information NAVAREA IV and XII, HYDROLANT, HYDROPAC, HYDROARC and U.S. Coastal Warnings for their given operational location. The Navigator will contact NGA Navigation Safety for any changes to AIG for NAVAREA and HYDROLANT/PAC/ARC, and the USCG for AIG changes for U.S. Coastal Warnings.

(v) If available and/or installed, utilize NAVTEX system for operations in areas where USCG or NGA broadcast warnings are not available.

(2) Although Department Heads (Combat Systems Officer, Operations Officer, etc.) are responsible for the maintenance and upkeep of navigation equipment that fall under their departments' cognizance, the NAV will also ensure the proper operation and care of all navigational equipment. To this end, the NAV will:

(a) Establish the requirement to determine and record gyrocompass/INS and repeater error at least once daily underway and before restricted maneuvering situations. Log the results and, prior to restricted maneuvering situations, report the results to the CO. The NAV will direct comparisons of the master/auxiliary gyrocompass and Digital Fluxgate Magnetic Compass (DFGMC)/Navy Standard Magnetic Compass (NSMC) to be made and recorded for every course change, or at least every half-hour. The NAV will train their team for and practice alternative methods of determining gyrocompass error. Reference (s) contains numerous methods of determining compass error.

(b) Adjust and compensate the magnetic compass per required Preventative Maintenance System (PMS) and Chapter 3, paragraph 4.b.

(c) Ensure Coordinated Universal Time (UTC) United States Naval Observatory (USNO) time checks are passed throughout the ship before any special evolution and logged in the Ship's Deck Log or VDR. UTC (USNO) is most commonly obtained from a properly configured GPS (PPS) receiver set to operate in UTC timing mode.

(d) Ensure assigned navigation equipment are maintained and properly adjusted per the PMS and, if appropriate, that calibration curves or tables are maintained and checked at prescribed intervals. Any degradation to navigation equipment will be reported to the CO. All changes in the status of navigation equipment, both planned and unplanned, shall be logged in the Deck Log, and reported via Casualty Report (CASREP) if not immediately corrected.

(e) Coordinate with the ship's Electronics Material Officer (EMO) to ensure appropriate Combat Systems Operational Sequencing System (CSOSS) procedures are followed when setting up navigation equipment. Train and verify the proficiency ship's navigation personnel on proper equipment setup to ensure correct operation.

(f) Supervise and maintain the classification level of the ECDIS-N, to include modifying normal routines and practices if the ECDIS-N is taken to a level above UNCLASSIFIED.

(g) Establish the requirement in the NAVBILL to determine which VMS node will be maintained as "MASTER" and status should neither be transferred nor should the VMS sensor alignment be altered without the NAV's or OOD's express permission.

(3) Ensuring the Special Navigation Evolution Checklists contained in Appendix C are completed and retained onboard as required; log the commencement and completion of all checklists in the Ship's Deck Log or VDR.

(4) Preparing reports and records as required in connection with the NAV's navigational duties, including those pertaining to the compasses, hydrography, oceanography, meteorology, and electronic navigation systems.

(5) Ensuring required navigational training is conducted and proficiency is checked for all appropriate personnel, such as junior officers, navigation watch standers, boat coxswains and boat officers.

(6) Relieving the OOD as authorized or directed in writing by the CO.

(7) Reporting to the CO in all matters about the navigation of the ship and to the XO in all matters concerning the administration of navigation and the training and proficiency of deck and watch officers (NAV may report to the Senior Watch Officer for the training of deck and watch officers.).

(8) Maintaining the ship's Navigation Bill or providing updates to the ISIC that is responsible for the hull's NAVBILL (LCS).

(9) Establishing a generic navigator email address (nav@ship.navy.mil). This will allow NGA to provide relevant information directly to the navigation department regardless of the individual assigned.

(10) Providing Small Boat Officers with required navigation information and chartlets (if required) prior to deployment of the ship's boats.

(11) Administering monthly Rules of the Road exam per reference (e), and remediation within 7 days when required.

f. Assistant Navigator (ANAV)/Qualified Senior QM. The ANAV and qualified Senior QM (if not also designated as ANAV) will assist the NAV in all aspects of navigation, piloting, and administration of navigation. ANAV will ensure proper preparation of the various reports required by higher authority. The ANAV will be formally designated in writing by the CO.

(1) Establish a generic ANAV email address (anav@ship.navy.mil). This will allow NGA to provide relevant information directly to the navigation department regardless of the individual assigned.

(2) Will be the primary map account holder in the DLA Mapping Enterprise Business System (MEBS). See Chapter 3 for details.

g. Combat Information Center Officer (CICO). Responsible for the operation and maintenance of the combat information center (CIC) and related spaces. The CICO oversees the collection, analysis, display, and dissemination of combat and operational information. Most importantly, the CICO assists the NAV and OOD with the safe navigation of the ship by ensuring CIC maintains complete navigational and surface contact plots.

h. Navigation Team. In addition to the CO, XO, NAV, ANAV or qualified Senior QM, and CICO, there are other key crewmembers responsible for safe navigation. Listed below are the duties and responsibilities of the Navigation Team.

(1) Bridge

(a) Officer of the Deck (OOD) Underway. Per reference (1), designated by the Commanding Officer to be in charge of the ship including its safe and proper operation. The OOD reports directly to the CO for the safe navigation and general operation of the ship; to the executive officer for carrying out the ship's routine; and to the navigator on sighting navigational landmarks, and on making course and speed changes. Among other duties, the OOD must:

1. Be aware of the tactical situation and geographic factors which may affect safe navigation and take action to avoid the danger of grounding or collision following tactical doctrine, the U.S. Coast Guard Navigation Rules of the Road, and the orders of the CO or other proper authority. The OOD will issue necessary orders to the helm (via the CONN) and main engine control to avoid danger, to take or keep an assigned station, and to change course and speed following orders of proper authority

2. Supervise the personnel on watch on the bridge, ensure that all required deck log entries are made, and sign the log at the end of the watch.

(b) Junior Officer of the Deck (JOOD). When assigned, serves as the principal assistant to the OOD. The JOOD performs and assists in duties the OOD may direct.

(c) Conning Officer (CONN). Responsible for the safe navigation of the ship and issues orders to the helmsman/lee helmsman. The CONN must monitor the Helmsman/Lee Helmsman for compliance with ordered course and speed. The CONN is the only person that issues orders to the helm, hence assumption of the CONN must be formally announced and acknowledged by bridge watch standers so there is no confusion. Procedures and requirements on relieving the CONN (to include personnel who are authorized and designated by the CO the ability to relieve the CONN if necessary) must be clearly delineated in the Standing Orders and/or Navigation Bill.

(d) Navigation Evaluator. Evaluates the accuracy of the ship's position as determined by all available means. This person is responsible for evaluating fix accuracy and making fix reports as specified in this instruction. Provides periodic Navigation Evaluator's Report (if required) and must provide a report as to whether or not ordered course is safe from hazards to navigation and for what distance it is deemed safe (Safe for Navigation Report). The Navigation Evaluator supervises and coordinates the actions of all Navigation Team members. If the NAV is not the Navigation Evaluator, the ANAV or Senior QM/OS should stand this watch. The Navigation Evaluator will have no additional duties during Navigation Detail.

(e) Navigation Plotter. Maintains the navigation plot, must plot and label each fix on the chart in use, will extend the dead reckoning (DR) at least two fix intervals (non-ECDIS-N), compute or relay set and drift and evaluate ship's projected movements, and will make recommendations to the Navigation Evaluator. Navigation Plotter will compute or relay such items as distance right or left of proposed track, time and distance to the next course change, revised turn bearings, and any other tasks directed by the Navigation Evaluator. The Navigation Plotter will plot and compare visual, RADAR or composite positions as necessary not to exceed every third fix interval. On ECDIS-N certified ships, the ECDIS-N Display Operator (Navigation Plotter) will be a qualified VMS Operator and will enter visual and/or RADAR LOPs into VMS using actual observed bearing and ranges. Furthermore, the Navigation

Plotter will recommend to the Navigation Evaluator all navigation aids to be utilized as back-up in determining position.

(f) Bearing Recorder. Acts as the Navigation Evaluator's communicator on the designated sound-powered or internal telephone circuit, relays information received to the Navigation Plotter or ECDIS-N Display Operator, maintains the Standard Bearing Book (OPNAV Form 3530/3) according to current directives, and gives "marks" to the bearing takers, as directed by the Navigation Evaluator. In addition, the Bearing Recorder will log GPS (PPS) position and the FOM at every mark in the Bearing Book or Position Record Book and will report the FOM to the Navigation Evaluator. The Bearing Recorder will record soundings at each mark.

(g) Bearing Takers. Obtain accurate bearings, compensating for known pelorus errors (if not already compensated by the Bearing Recorder), to navigation aids designated by the Navigation Evaluator and provide them to the Bearing Recorder. Advise the Bearing Recorder about navigation aids available for use, including the gain and loss of navigation aids from sight. Bearing Takers will keep the aids in sight between shots. Additionally, they will know the location and use of pelorus benchmarks (e.g., benchmark errors will be applied to relative bearings in the event of a loss of gyro).

(h) Fathometer Operator. Operates the fathometer on a scale commensurate with the depth soundings of the chart in use (feet, meters or fathoms) or as directed by the Navigation Evaluator. Reports soundings to the Bearing Recorder. The minimum sounding expected should be known, briefed, and reported if reached. The Navigation Evaluator must be advised if difficulty is experienced in obtaining a sounding. During restricted water transits the fathometer paper trace must be recording.

(i) Quartermaster of the Watch (QMOW). The QMOW is the direct representative of the NAV and provides a continuous navigational watch on the bridge outside Navigation Detail. For ZUMWALT class, Junior Officer of the Watch (JOOW) fulfills the role of QMOW. QMOW will assist the Navigation Evaluator and OOD in navigating the ship and will immediately inform the NAV, OOD, and ANAV or Senior QM/OS when discrepancies arise. The QMOW has numerous duties, including the keeping of various records, logs, and weather observations and obtaining fix information. The OOD must recognize this and if fix taking encumbers the QMOW from performing all other duties, the Senior QM/OS, ANAV, or NAV will be requested to provide additional assistance to the QMOW. This instruction cannot possibly cover all situational requirements that may arise. However, the QMOW is charged with the following minimum responsibilities:

1. Assist the OOD, Navigation Evaluator, NAV, and ANAV in plotting the ship's position. Maintain a DR and Estimated Position plot (not applicable to ECDIS-N certified ships). Immediately notify the NAV of any discrepancies noted during the watch.

2. Maintain the Ship's Deck Log, Magnetic Compass Record, and weather observation sheet.

3. Compare CIC derived positions and ship's relation to track and Position of Intended Movement (PIM) with the bridge position and determine if differences exist (Not applicable to ECDIS-N certified ships).

4. Compute and log set and drift. If ECDIS-N authorized, monitor and log system calculated set and drift, watching in particular for inaccuracies during turns, at low speeds, and at anchor.

5. Calculate when an aid to navigation or RADAR landfall should be sighted and report whether or not it is detected as specified in the CO's Standing Orders.

6. Note when a change in weather or the visibility decreases to less than the distance specified in the CO's Standing Orders. Make log entries as required.

7. Determine the master/auxiliary gyrocompass/INS errors daily and before entering restricted waters, recording any errors in the Bearing Book, Magnetic Compass Record Book, and Deck Log.

8. Ensure compass comparisons between the bridge gyrocompass/INS repeaters and magnetic compass are made every time a new course is set and at least every 30 minutes, recording comparison data in the Magnetic Compass Record Book or Deck Log.

9. Note malfunctions of any electronic navigation systems including speed and heading inputs. Inform the NAV and OOD of any change in the status of such equipment and log in the Ship's Deck Log the time and nature of such.

10. Obtain soundings using the fathometer at each fix, or as directed by the CO, Emissions Control (EMCON) conditions permitting. Verify sounding information corresponds to ship's position. As a rule of thumb, charted water depths have an accuracy of 10 percent in waters less than 1000 fathoms and 20 percent in waters deeper than 1000 fathoms.

11. Calculate sunrise, sunset, moonrise, and moonset daily and determine gyro error as directed by the NAV.

12. Record 0800, 1200, and 2000 positions in the Ship's Deck Log. If required by the CO, prepare the ship's 0800, 1200, and 2000 Ship's Position Reports for submission to the NAV. Electronic reports via email are authorized.

13. Prepare notes for CO's Night Orders notebook as directed by the NAV.

14. Before special evolutions, ensure UTC(USNO) time checks are conducted on the IMC and logged in the Ship's Deck Log.

15. Perform celestial observations according to Appendix K (Not applicable to LCS class ships). Record results in the Navigation Workbook. When using System to Estimate Latitude and Longitude Astronomically (STELLA) computer software, documentation of all observations must also be maintained in hard copy with the ship's navigation records for 12 months.

16. Conduct a watch turnover using a checklist such as that detailed in Appendix C.

(j) Lookouts. The lookout watch mans assigned lookout stations and performs duties per the ship's lookout directions. The posting and training of lookouts must conform to reference (e) and the

Protective Measures Assessment Protocol (PMAP). All ships will maintain port, starboard, and aft lookouts.

(k) Helmsman. A qualified and proficient helmsman, as recorded in the service record, steers courses ordered by the conning officer.

(l) Master Helmsman. The master helmsman holds a higher qualification than the helmsman and is utilized during all restricted maneuvering evolutions. Their relationship with the conning officer will be the same as for a helmsman. They will additionally be under the supervision of the helm safety officer.

(m) Lee Helmsman. A qualified and proficient lee helmsman, as recorded in the service record, stands watch at the engine order telegraph on the bridge and rings up the conning officer's orders to the engines ensuring that all bells are correctly answered.

(n) Helm Safety Officer. The helm safety officer will be a commissioned officer. When transiting in restricted waters, conducting special evolutions, or at any other time deemed necessary by the CO or OOD, a Helm Safety Officer will be assigned. This individual will be PQS qualified and proficient, and will ensure that steering control station personnel acknowledge and comply with all orders from the conning officer. He or she will assist as necessary in the event of a steering casualty and have no other duties while assigned.

(2) Combat Information Center (CIC)

(a) Tactical Action Officer (TAO). When assigned, the TAO is overall responsible for the smooth and efficient operation of CIC. The TAO will ensure that CIC supplies all the necessary information and required forceful backup to the bridge to ensure safe navigation. Thus, the TAO, when assigned, is overall responsible for all information, including all navigation recommendations, from CIC during any condition of readiness.

(b) Combat Information Center Watch Officer (CICWO). Representative of the CICO and supervises the operation of CIC during the watch period. The CICWO reports directly to the TAO (when assigned) for matters pertaining to the tactical situation or the operation of combat systems, and reports to the OOD in supplying the bridge combat and tactical information and recommendations concerning the maneuvering and safe navigation of the ship. The CICWO (when a TAO is not assigned) is overall responsible for all information, including all navigation recommendations, from CIC during any condition of readiness.

1. Supervises all personnel on watch in CIC, including the CIC navigation team.
2. Keeps the OOD advised of recommended procedures for maintaining station, avoiding navigational hazards and collisions, and speed or course changes necessary to change or regain station.
3. Reports all landfalls, maintain navigation track, and position when within radar range of land, when operations are conducted in dangerous or restricted waters and during sorties and entries; report to the OOD when the unit is standing into danger and as the OOD directs.

4. Ensure that the CIC logs are properly maintained for the duration of the watch.

5. Be familiar with the operation plans, orders, tactical publications, directives, and regulations of higher authority which affect the watch or the operation of the CIC.

(c) Piloting Officer. Supervises the CIC navigation team to ensure accurate and prompt fixing and evaluation of the ship's position by using all electronic means available. Gives careful attention to ship's course, speed and available depth of water when approaching land or shoal water. Advises the Bridge of the ship's position, recommended courses and times to turn, position of geographic and navigational objects and hazards in vicinity of the ship. Piloting Officer recommends alternate courses, if available, to the Navigation Evaluator when the track is blocked or made hazardous by the presence of shipping or other contacts. Maintains communications with the Navigation Evaluator and Shipping Officer, and keeps them advised of impending course and speed changes in order to determine which contacts should be prioritized. In the event that the Piloting Officer does not concur with the Bridge, recommend course and speed changes and log non-concurrence on the CIC Watch Log. Only one concurrence fix is required. Concurrence can come from a Bridge visual or composite fix, or a combination of a CIC radar fix and/or Bridge visual or composite fix.

1. For Non-ECDIS-N ships, the Piloting Officer ensures the CIC Navigation Team obtains ship's position and properly maintains the CIC navigation plot. Fixes from various sources will be compared to determine fix uncertainty. When uncertainty is considered excessive per the CO's Standing Orders, the Piloting Officer will recommend bare steerageway until the problem is resolved. The Piloting Officer will ensure all required information is logged in the RADAR Navigation Log and passed to the Navigation Evaluator.

2. For ECDIS-N 9.1 Ships, the Piloting Officer ensures that the CIC Navigation RADAR Operator relays accurate ranges to the CIC Navigation Recorder and/or the Bridge Bearing Book Recorder. Will verify that the Navigation Recorder logs all ranges provided by the Navigation RADAR operator.

3. For all other versions of ECDIS-N, visual and RADAR fixes can be entered from two separate nodes. Bridge VMS Operator will enter all visual LOPs and CIC will enter RADAR fixes. Bridge remains the Master VMS control station.

4. Piloting Officer will make 'safe for navigation reports' to the NAV Evaluator. Additional reporting requirements are not required for ECDIS-N ships, unless specified otherwise in the ship's NAVBILL.

(d) Navigation RADAR Operator. Provides all RADAR ranges as directed by the Piloting Officer, Navigation Plotter, or ECDIS-N Display/VMS Operator. Keeps the Navigation Plotter and Bearing Recorder (through the Navigation Recorder) informed of designated points available for use.

(e) CIC Navigation Plotter. Maintains the CIC navigation plot and will plot and label each fix on the chart in use. The Navigation Plotter will ensure the DR is extended at least two fix intervals; compute and relay set and drift since last fix; and evaluate ship's projected movements. Navigation Plotter will compute and relay such items as time and distance to the next course change, revised turning

ranges, and any other tasks directed by the Piloting Officer, and will make recommendations to the Piloting Officer. On ECDIS-N certified ships, the CIC Navigation plotter is not required.

(f) Navigation Recorder. Performs as a phone talker and monitors the Bridge Bearing Recorder and Fathometer Operator on the designated phone circuit. Maintains the RADAR Navigation Log to coincide with Bridge Bearing Recorder “mark”.

(g) Bridge/CIC Phone Talker. If required, provides smooth flow of navigation information to the Navigation Evaluator, Piloting Officer, and Shipping Officer. Ensures reports and recommendations from the Piloting Officer and Shipping Officer are received and acknowledged by the Navigation Evaluator and that the stated intentions of the CO, Navigation Evaluator, OOD, and Conning Officer are reported to and acknowledged by the Piloting Officer. As manning permits, the Bridge CIC Phone Talker should be manned by an OS who is experienced in all aspects of restricted water transiting and piloting.

(h) Shipping Officer (May be located in CIC or Bridge). When assigned, maintains direct communications with the Piloting Officer. Responsible for providing the evaluated surface display reports to the CONN, and must provide a report as to whether a course change ordered is safe from shipping hazards to navigation and for what distance it is deemed safe (i.e., safe for navigation report or “clear/foul” report). Supervises and coordinates the CIC contact management team and the lookouts. The Shipping Officer will recommend proper actions to be taken per reference (e). Additionally, ensures a record of all surface contacts encountered are logged and recorded. Depending on ship design or configuration, reports to the CONN may occur separate from the Navigation Evaluator and Piloting Officer circuit. During any condition of readiness, the TAO, CICWO, or SUWC may recommend stationing of a Shipping Officer during situations such as an increase in shipping and change in environmental or current operations.

1. When assigned, the Shipping Officer reports directly to the CONN or OOD, but the CICWO (or TAO when assigned) will monitor their performance and recommendations, and address any discrepancies that arise from the Shipping Officer's recommendation and the OOD's actions with the CO if necessary. The CICWO (or TAO when assigned) is overall responsible for all information, including recommended course and speed changes, from the CIC team during any condition of readiness.

(i) Surface Warfare Coordinator (SUWC). When assigned, in addition to their tactical responsibilities, is the primary surface contact management and contact avoidance watch stander and will make reports to the CICWO (or TAO when assigned). When a shipping officer is stationed, the SUWC must conduct a formal hand-off of navigation related duties to the shipping officer. For ships without SUWC listed in the construct of the CIC organization (i.e., CVN, LHA/D, LCS, etc.), the CICWO (TAO for LCS, Tactical Operations Plot Watch Officer (TOPWO) for CVN) will perform the role as the primary surface contact management and contact avoidance watch stander.

(j) Navigation Suite System Administrator. Controls and maintains all username and passwords associated with the VMS. At no time, will anyone in the voyage plan generation or approval process have permissions of the administrator or use someone else's username or password other than their own for a given position or workstation. Passwords are the primary authentication mechanism used within VMS and the security of VMS and safety of navigation are directly tied to password policies and implementation.

(3) Engineering

(a) Aft Steering Helmsman. A qualified and proficient after steering helmsman, as recorded in the service record, steers courses ordered by the conning officer when steering control has been transferred to aft steering.

(b) Aft Steering Electrician's Mate (EM) or Auxiliary Technician. Will be qualified and proficient to monitor, operate, and shift steering units and handle steering equipment emergencies.

(c) Aft Steering Helm Safety Officer. The helm safety officer will be a commissioned officer. When transiting in restricted waters, conducting special evolutions, or at any other time deemed necessary by the CO or OOD, an Aft Steering Helm Safety Officer will be assigned. This individual will be PQS qualified and proficient, and will ensure that steering control station personnel acknowledge and comply with all orders from the CONN. They will assist as necessary in the event of a steering casualty and have no other duties while assigned.

(d) Small Boat Officer. The small boat officer, in addition to those responsibilities and relationships outlined in reference (l), is responsible for the navigation of the ship's boat when deployed. To this end, they must ensure the boat has and proficiently employs chartlets of the prescribed route (as required) and that the Rules of the Road (per reference (e)) and proper boat etiquette are observed.

2. Qualifications. Minimum qualifications for the Navigation Team are contained in Table 2-A. This table reflects qualification requirements; specific watch station requirements are reflected in Tables 2-B through 2-D. Requests for waivers on any of these requirements will be considered on a case-by-case basis and will be addressed to the ship's TYCOM via the ISIC. Beyond qualification, COs will consider proficiency and currency in their watch bills.

3. Navigation Team (Bridge, CIC, and Engineering) Composition. The composition of the navigation team, as shown in tables 2-B through 2-D, is determined by the ship's distance in nautical miles (NM) from land or shoal water.

Requirement	CNSF Navigator	CNAF (Non-11XX) Navigator/ANAV	CNSF Senior QM	CNAF Senior QM	QMOW
BUPERS Assigned	No	Yes	No	No	No
Qualified OOD Underway	Yes ²	Yes ¹	No	No	No
SWOS Advanced Ship handling	No	Yes ³	No	No	No
SWOS Navigation Officer (J-4N-0009) NEC W12A ¹²	Yes	Yes ³	Yes ⁸	Yes ⁸	No
Quartermaster Journeyman Course (A-061-0300) NEC W13A ¹²	No	No	No	No	Yes ⁶
VMS Operator Course (VMS 7/8 A-061-0042; VMS 9 A-061-0044/ S-061-0008; and S-102-0696 (ISEA 5-day ECDIS-N Upgrade Course) ^{4,5}	Yes	Yes	Yes	Yes	Yes
Navigation Scope Operator ¹⁷	Yes ²	Yes ²	Yes ²	Yes	Yes
AN/SPA-25G/H PQS or JQR (CNSF-43492-JQR-002) ^{9,10,16}	Yes ²	Yes ²	Yes ²	Yes	Yes
Bridgemaster E Series RADAR Operator (CNSF-43492-JQR-003) ^{9,10}	Yes ²	Yes ²	Yes ²	Yes ²	No
AN/SPS-73(V) Surface Surveillance RADAR (SSR) Operator (CNSF-43492-JQR-004) ^{9,10}	Yes ²	Yes ²	Yes ²	Yes ²	No
Navigator/ANAV PQS (NAVEDTRA 43492-2)	Yes	Yes	Yes	Yes	No
VMS Operator PQS (ECDIS-N Certified Ships)	Yes	Yes	Yes	Yes	Yes
Conn JQR (CNSF-JQR-005) ⁹	Yes	Yes	No	No	No
Helm Safety Officer PQS	Yes ²	Yes ²	No	No	No
AIS JQR (CNSF-43492-JQR-001) ^{9,10}	Yes ²	Yes ²	Yes ²	Yes ²	No

Requirement	OOD	CONN ¹³	Helm Safety Officer ¹³	Helmsman/ Master Helmsman ¹³	Lee Helmsman ¹³	NAV ET
Qualified OOD Underway	Yes	No	No	No	No	No
VMS Operator Course (VMS 7/8 A-061-0042; VMS 9 A-061-0044/ S-061-0008; and S-102-0696 (ISEA 5-day ECDIS-N Upgrade Course) ^{4,5}	No	No	No	No	No	No
Navigation Scope Operator ¹⁷	Yes	Yes	No	No	No	No
AN/SPA-25G/H PQS or JQR (CNSF-43492-JQR-002) ^{9,10,16}	Yes	Yes	No	No	No	No
Bridgemaster E Series RADAR Operator (CNSF-43492-JQR-003) ^{9,10}	Yes	Yes	No	No	No	No
AN/SPS-73(V) Surface Surveillance RADAR (SSR) Operator	Yes	Yes	No	No	No	No

Requirement	OOD	CONN ¹³	Helm Safety Officer ¹³	Helmsman/ Master Helmsman ¹³	Lee Helmsman ¹³	NAV ET
(CNSF-43492-JQR-004) ^{9,10}						
Navigation Equipment Technician (A-670-0017) NEC V31B/V38B ¹²	No	No	No	No	No	Yes ⁷
CONN JQR (CNSF-JQR-005) ⁹	Yes	Yes	Yes	No	No	No
Helm Safety Officer PQS	Yes	No	Yes	No	No	No
Helm PQS	No	No	No	Yes	No	No
Lee Helm PQS	No	No	No	Yes	Yes	No
AIS JQR (CNSF-43492-JQR-001) ^{9,10}	Yes	Yes	No	No	No	Yes

Requirement	CICWO	Piloting Officer ¹³	Shipping Officer	SUWC ¹³	Lookout	Aft Steering Safety Officer	Aft Steering Helmsman
CICWO PQS	Yes	No	No	No	No	No	No
Piloting Officer PQS	No	Yes	No	No	No	No	No
Shipping Officer PQS	No	No	Yes	No	No	No	No
VMS Operator Course (VMS 7/8 A-061-0042; VMS 9 A-061-0044/ S-061-0008; and S-102-0696 (ISEA 5-day ECDIS-N Upgrade Course) ^{4,5}	No	Yes ¹¹	No	No	No	No	No
VMS Operator PQS (ECDIS-N Certified Ships)	No	Yes	No	No	No	No	No
Navigation Fundamentals Course (A-061-0200)	No	Yes ¹¹	Yes ¹¹	No ¹⁵	No	No	No
Navigation Scope Operator ¹⁷	No	Yes	Yes	No	No	No	No
AN/SPA-25G/H PQS or JQR (CNSF-43492-JQR-002) ^{9, 10, 16}	No	Yes	Yes	Yes	No	No	No
Bridgemaster E Series RADAR Operator (CNSF-43492-JQR-003) ^{9,10}	No	Yes	Yes	Yes	No	No	No
AN/SPS-73(V) Surface Surveillance RADAR (SSR) Operator (CNSF-43492-JQR-004) ^{9,10}	No	Yes	Yes	Yes	No	No	No
SUWC PQS	No	No	No	Yes	No	No	No
Lookout PQS (NAVEDTRA 43492-2J, 302; DDG1000: 43703-10, 303)	No	No	No	No	Yes	No	No
Aft/Helm Safety Officer PQS ¹⁴	No	No	No	No	No	Yes	No
Aft Steering Helmsman PQS ¹⁴	No	No	No	No	No	No	Yes
AIS JQR (CNSF-43492-JQR-001) ^{9,10}	Yes	No	Yes	Yes	No	No	No

Table 2-A Qualification Requirements

NOTES:

1. If BUPERS assigned, must complete OOD qualification on currently assigned ship within 6 months of reporting.
2. Must be qualified on the ship in which assigned as NAV/ANAV/Senior QM. Navigator must qualify OOD within 6 months of reporting.
3. Will be conducted as part of pipeline training in BUPERS orders for carrier NAV/ANAVs.

4. For CNSF ECDIS-N certified ships, the following graduates are required: Navigator, all QMs (must be fulfilled by the start of FY21), and a minimum of 1 CIC watch stander per watch team with a minimum of 3 CIC watch standers onboard (CRUDES/L-Class) or 1 CIC watch stander (PC). CIC minimum requirement is not applicable for MCM & LCS classes. CNSF requirements for CIC graduates are effective before a ship begins RADAR Navigation Team Refresher Course (J-221-0344) as listed in Chapter 1. For LCS, 7 graduates are required: Navigator, 3 OODs, 3 JOODs. For CNAF ECDIS-N certified ships, the following graduates are required: 7 VMS operators, 2 of which must be CIC watch standers.
5. Personnel must be a graduate of the applicable VMS operator course installed onboard the ship. Additionally, QMs returning to sea duty following a shore tour will attend the associated VMS operator course prior to or upon reporting to their ship. Completion of NEC W12A and NEC W13A satisfy this requirement.
6. By the start of FY21, QMs E4-E5 previously qualified QMOW and returning for their second sea tour will attend the Quartermaster Journeyman Course (A-061-0300) NEC W13A. Due to the lack of course graduates and schoolhouse throughput restraints, CNSF and CNAF ships will execute a phased approach allowing time for personnel to attend the course who have been previously qualified. However, by the start of FY24, all previously qualified QMOWs must complete the course in order to maintain their designation for qualification.
7. For ships certified to navigate using ECDIS-N, one of two technicians per CNSF ships (one per PC or LCS), four technicians per CNAF ships, maintenance training COI and hold NEC V31B (V38B for Zumwalt Class). Per CNSF implementation plan, by FY18-FY19, ships must have a minimum of one V31B or V38B holder while the other technician may be one of the following legacy NECs: V87B; 4720/767A; or V71B. By the start of FY20, ship manning for the navigation equipment technician will be filled by NEC V31B or V38B only. For PC and LCS classes, they may have technicians with legacy NEC until FY20.
8. By the start of FY21, all CNSF/CNAF Senior QMs onboard ships will be required to have NEC W12A in order to be designated in writing as the Senior QM. Due to lack of course graduates and schoolhouse throughput constraints, CNSF/CNAF will be executing a phased approach for Senior QMs that fail the course. During the transition period, Senior QMs that fail the course may be designated as the Senior QM onboard upon TYCOM approval and, as necessary, with a remediation plan in place. Additionally, by the start of FY21, all ISIC QM Navigation assessors and QM instructors (E-6 and above) will be required to have NEC W12A. Completion of the Surface Navigator/Assistant Navigator course also satisfies either the VMS 8 or 9 course completion requirement.
9. JQRs will be replaced by a follow on NAVEDTRA. Once the PQS is published, it will replace the JQR requirement listed within the table above.
10. JQR will be required if applicable system is installed on ship.
11. By the start of FY21, the COI will be required for all personnel to be qualified. Due to the lack of course graduates and schoolhouse throughput restraints, CNSF and CNAF ships will execute a phased approach allowing time for personnel to attend the course who have been previously qualified; however, by the start of FY21, all previously qualified watch standers must complete the course in order to maintain their designation for qualification.
12. Per the NEC Modernization Construct, Quartermaster NEC 0202 and NEC 0203 were changed to W12A and W13A, respectively. Additionally, NAV ET NEC changes include: 9617 is now V31B; NEC 9624 is now V38B; NEC 9612 is now V87B; and NEC 4727 is now V71B.
13. CONN, Piloting Officer, SUWC, Helmsman, Lee Helmsman, Master Helmsman, and Helm Safety Officer are not required for LCS Class ships.
14. LCS Class ships will complete After Steering Helmsman and After Steering Helm Safety Officer JQRs established by LCSRON ONE and TWO.
15. Recommended for watch standers who have not received formal navigation training (i.e. BDOC, ADOC, etc).
16. NAVEDTRA (43398-13B) for CG/DDG classes. For all other classes of ships equipped with SPA-25G/H, complete JQR (CNSF-43492-JQR002).
17. Use platform-specific Navigation Scope Operator PQS, e.g., NAVEDTRA 43398-13B 316 for CG/DDG Classes; NAVEDTRA 43312 307 for LSD SSDS MK 1; NAVEDTRA 43490-C 310 for SSDS MK 2 (CVN, LHA, LHD, LPD, and LSD Classes); NAVEDTRA 43496-7B (CH 1) 305 for LHD; NAVEDTRA 43311-4A (CH 1) 310 for LCS; etc.

	Restricted ⁵ Waters	Piloting Waters	Open Ocean/ Coastal Waters
Distance from Land or Shoal Water	<2 NM	2-10 NM	>10 NM
Watch Station			
Bridge			
OOD	Yes	Yes	Yes
CONN	Yes	Yes	Yes
Navigation Evaluator	Yes	Note 1	No
QMOW (Navigation Plotter/ECDIS-N Display Operator)	Yes	Yes	Yes
Bearing Recorder	Yes	Note 1	No
Bearing Takers	Yes	Note 1	No
Fathometer Operator	Yes	Note 1	No
Bridge/CIC Phone Talker ²	Yes	Note 1	No
Port/Stbd/Aft Lookouts	Yes	Yes	Yes
Helmsman/Master Helmsman	Yes	Yes ⁷	Yes ⁷
Lee Helmsman	Yes	Yes ⁷	Yes ⁷
Helm Safety Officer	Yes	Note 1	No
NAV Equipment Technician	Yes	No ⁶	No ⁶
CIC			
TAO	Note 9	Note 9	Note 9
CICWO	Yes	Yes	Yes
Piloting Officer	Yes	Note 1	No
Navigation RADAR Operator	Yes	Note 1	No
Navigation Plotter (Non ECDIS-N ships only)	Yes	Note 1	No
Navigation Recorder	Yes	Note 1	No
Shipping Officer	Yes	Note 3, 5	Note 3, 5
SUWC (Surface Warfare Coordinator)	No ⁴	Yes ⁴	Yes ⁴
Engineering			
Aft Steering Helmsman	Yes	No ⁹	No ⁹
Aft Steering EM	Yes	No ⁹	No ⁹
Aft Steering Auxiliary Technician (MM/EN)	Yes	No ⁹	No ⁹
Aft Steering Helm Safety Officer	Yes	No ⁹	No ⁹

Table 2-B Required Watch Stations for Ships (Except ZUMWALT LCS Class)

NOTES:

1. Per Navigation Bill.
2. Communications between Bridge Evaluator and Piloting Officer are not restricted to sound-powered phones. Any communication method that provides for immediate and accurate sharing of navigation information, including use of radios by the two watch stations, is authorized.
3. A Shipping Officer will be manned while transiting in any strait, high traffic density area, or Traffic Separation Scheme (TSS).
4. SUWC is primarily responsible for contact management in CIC. During times when the tactical situation is such that SUWC is unable to perform both duties simultaneously, the Shipping Officer will be manned and take over responsibilities for contact management and avoidance. TAO or CICWO (if TAO is not assigned) will decide and authorize when the additional qualified watch stander is stationed.
5. While conducting Mine Countermeasure Operations (MCM OPS) in restricted waters, the ship can station a modified navigation detail as follows, such as the watch stations are qualified for the position being covered. Bridge

Helm Safety Officer, Bearing Takers, and Bearing Recorders will be stood down. Fathometer operator watch station will be covered by QMOW. Navigation Phone Talker will be covered by Navigation Evaluator. Piloting Officer watch station will be covered by CICWO only when the MCM Evaluator is present. Shipping Officer watch station will be covered by JOOD. Aft Steering Helmsman, Aft Steering EM, Aft Steering Auxiliary Technician and Aft Steering Safety Officer will be listed stood down and called away as necessary. All other watch stations will be maintained per Table 2-B in restricted waters.

6. Navigation Equipment Technician must be on call and available to respond to casualty at a moment's notice.

7. While conducting special evolutions outside of restricted waters in close proximity to other ships (i.e., UNREP and any other evolutions deemed necessary by the CO), the Helmsman and Lee Helmsman will be separate watch standers. The Master Helmsman will replace the Helmsman at the discretion of the CO. All engineering watches listed above will be manned. During all other conditions of steaming for piloting waters and greater, the Helmsman and Lee Helmsman watches can be combined into one watch stander at the CO's discretion. The single watch stander must be a qualified and proficient Helmsman (completed PQS 304, in which PQS 303 Lee Helmsman is a pre-requisite).

8. Stationed per readiness condition.

9. When transiting in restricted waters, Replenishment at Sea (i.e. UNREP), or at any other time deemed necessary by the CO or OOD, an Aft Steering Helm Safety Officer, Aft Steering Helmsman, Aft Steering EM, and Aft Steering Auxiliary Technician (MM/EN) will be assigned.

	Restricted Waters	Piloting Waters	Open Ocean/ Coastal Waters
Distance from Land or Shoal Water	<2NM	2-10 NM	>10NM
Watch Stations			
Bridge			
OOD	Yes	Yes	Yes
JOOW ^{2,3}	Yes	Yes	Yes
JOOD ³	Yes	Yes	No ³
CONN	Yes	Yes	No ²
Helm Safety Officer	Yes	Note 1, 13	No ¹³
Navigation Evaluator ⁴	Yes	Note 1	No
ECDIS Display Operator	Yes	Note 1	No
Navigation Phone Talker / Recorder ⁵	Yes	Note 1	No
Port/Stbd/Aft Lookouts	Yes	Yes	Yes
NAV Equipment Technician	Yes	No ¹⁰	No ¹⁰
Ship Mission Center (SMC)			
TAO	Note 14	Note 14	Note 14
CICWO/SMCWO	Yes	Yes	Yes
Piloting Officer ⁴	Yes	Note 1	No
Navigation RADAR Operator ⁶	Yes	Note 1	No
Navigation Recorder	Yes	Note 1	No
Shipping Officer ^{4,6}	Yes	Note 7, 8	Note 7, 8
Surface Warfare Coordinator (SUWC)	No ⁸	Yes ⁸	Yes ⁸
Forward Gyro Room			
Forward Gyro Operator ¹⁰	Yes	No	No
Aft Gyro Room			
Aft Gyro Operator ¹⁰	Yes	No	No
Secondary Ship Mission Center (SSMC)			
Aft Steering Helm Safety Officer ¹¹	Yes	Note 1, 13	No ¹³
Aft Steering Master Helmsman ¹¹	Yes	Note 1, 13	No ¹³
Port Steering Gear Actuator System (SGAS)			
Aft Steering EM ¹²	Yes	Note 1, 13	No ¹³
Aft Steering Auxiliary Technician ¹²	Yes	Note 1, 13	No ¹³
Stbd SGAS			
Aft Steering EM ¹²	Yes	Note 1, 13	No ¹³
Aft Steering Auxiliary Technician ¹²	Yes	Note 1, 13	No ¹³

Table 2-C Required Watch Stations for ZUMWALT Class Ships

NOTES:

1. Per Navigation Bill.
2. The Junior Officer of the Watch (JOOW) in ZUMWALT class ships fills the roles of Helmsman, Lee Helmsman, and Quartermaster of the Watch (QMOW). PQS qualification in each of these positions is a pre-requisite for qualification as JOOW. During all restricted maneuvering evolutions and any special evolution outside of restricted

waters (i.e., UNREP, operations in close proximity to other ships and vessels, such as PHOTOPS and VISEX, and any other evolutions deemed necessary by the CO), a JOOW qualified Master Helmsman will be stationed in that watch station. In open ocean, the JOOW also acts as the CONN.

3. The Junior Officer of the Deck (JOOD) in ZUMWALT class ships is stationed to assist the OOD in restricted and piloting waters. The JOOD may be posted at the OODs discretion to support operations in open ocean/coastal waters. When the JOOD is stationed, the roles of Helmsman/Lee Helmsman and QMOW may be split between the JOOD and JOOW if the JOOD has attained the appropriate qualification.

4. Any communication method that provides for immediate and accurate sharing of navigation information between Navigation Evaluator, Piloting Officer and Shipping Officer is authorized, including use of radios by the watch stations.

5. Navigation Phone Talker / Recorder acts as Navigation Evaluator's communicator and maintains the bridge bearing or position record book.

6. May be stationed on the Bridge or in SMC/SSMC.

7. A Shipping Officer will be manned while transiting in any strait, high traffic density area, or Traffic Separation Scheme (TSS).

8. SUWC is primarily responsible for contact management in CIC/SMC. During times when the tactical situation is such that SUWC is unable to perform both duties simultaneously, the Shipping Officer will be manned and take over responsibilities for contact management and avoidance. TAO or CICWO/SMCWO (if TAO is not assigned) will decide and authorize when the additional qualified watch stander is stationed.

9. Navigation Equipment Technician must be on call and available to respond to casualty at a moment's notice.

10. The Forward and Aft Gyro Operators fill the role of Fathometer Operator. The operation of the ship's forward and aft fathometers can only be directly monitored and controlled from these spaces. The operators have communications with the Navigation Evaluator on the Bridge.

11. When transiting in restricted waters, conducting special evolutions, or at any other time deemed necessary by the CO or OOD, an Aft Steering Helm Safety Officer, Aft Steering Helmsman, Aft Steering EM, and Aft Steering Auxiliary Technician (MM/EN) will be assigned. When the Aft Steering Helm Safety Officer and Aft Steering Master Helmsman are stationed in SSMC and a casualty occurs that results in steering control being passed to the port and starboard SGAS rooms, both watch standers will continue to monitor steering performance at the Aft Steering Control Console and provide guidance to the Port and Stbd SGAS rooms watch standers by voice communications, as needed.

12. The Aft Steering EM and Aux Technicians will complete a Local Steering Control Unit (LSCU) JQR. The SGAS rooms do not contain course indicators. The watch standers will execute rudder control via the LSCU in degrees only, in response to commands from the Conn or Aft Steering Safety Officer.

13. These watches will be stationed any time the Restricted Maneuvering Doctrine is placed in effect or Maximum Plant Reliability line up is established unless otherwise directed by the CO.

14. Stationed per readiness condition.

	Restricted Waters	Piloting Waters	Open-Ocean/ Coastal Waters
Distance from Land or Shoal Water	<2 NM	2-10 NM	>10 NM
Watch stations			
Bridge ²			
OOD	Yes	Yes	Yes
JOOD (ECDIS-N Display Operator)	Yes	Yes	Yes
Navigation Evaluator	Yes	Note 1	No
Navigation RADAR Operator ¹	Yes	Yes	Yes
Bridge/ICC/MCC Phone Talker ¹	Note 1	Note 1	No
TAO	Yes	Yes	Yes
Shipping Officer	Yes	Yes	Yes
Tactical Action Coordinator (TAC)/ Force Net Supervisor (FNS)	Yes	Yes	Yes
Port/Stbd/Aft Lookouts	Yes	Yes	Yes
NAV Equipment Technician	Yes	No ³	No ³
Waterjet Machinery Room (WMR)/Jet Equipment Room			
Aft Steering Helm Safety Officer	Yes	No ⁴	No ⁴
Aft Steering Helmsman	Yes	No ⁴	No ⁴

Table 2-D Required Watch Stations for LCS Class Ships

NOTES:

1. Per Navigation Bill.
2. CONN, Piloting Officer, SUWC, Helmsman, Lee Helmsman, Master Helmsman, and Helm Safety Officer are not required for LCS Class ships.
3. Navigation Equipment Technician must be on call and available to respond to casualty at a moment's notice.
4. When transiting in restricted waters, conducting special evolutions, or at any other time deemed necessary by the CO or OOD, an Aft Steering Helm Safety Officer and Aft Steering Helmsman will be assigned.

CHAPTER 3
STANDARD POLICIES, REQUIREMENTS, AND PROCEDURES

1. General. This chapter provides guidance on standard policies, requirements, and procedures that serve as the basis for development of each ship's routine. This guidance is equally applicable to all ships, regardless of the method authorized to maintain the navigation plot.

2. Policy. The navigation plot maintained on the Bridge is designated as the primary navigation plot. For ECDIS-N certified ships, CO's will designate which node on the bridge will be utilized for primary plot purposes in the Navigation Bill. The accuracy of navigation depends on a knowledgeable assessment of all position data derived from different sources. Each source and fix technique is subject to some error. Therefore, the Navigation Evaluator must assess each position determination and evaluate it with respect to all others. The decision to select a single source of positioning data or an averaging approach is based on his or her analysis of the factors that influence navigation sensor accuracy and the time available to gather and analyze the data. Navigation watch standers will plot all fixes and will compare fix information from available sensors and charted information prior to entering restricted waters and prior to any special evolutions. Outside restricted waters, fix comparison will be conducted at least hourly. All times will be recorded in reference to UTC(USNO), the DoD time standard.

a. The OOD will keep informed of the position of the ship and all other particulars that may be used to keep the ship out of danger and will employ all means available for detecting and avoiding danger. The CONN, QMOW, and other watch standers responsible to the OOD should never hesitate to request additional watch personnel or recommend stationing the full Navigation Team if a situation warrants. All team members are required to state when in their judgement the ship is standing into danger.

b. The ship's Navigation Bill will establish the precedence of specific fix sources (e.g., GPS (PPS), INS, visual, RADAR) for each of the areas identified in Table 3-A. See Chapter 4, paragraph 2 for approved fix sources

3. Requirements. The Navigation Team must satisfy the following requirements while the ship is underway.

a. Only DoD approved positioning, navigation, and timing (PNT) systems and software provided by a Naval Systems Command (i.e., NAVSEA, SPAWAR), will be used for legal navigation purposes onboard commissioned U.S. Navy ships. Commercial off-the-shelf (COTS) systems and software, if employed, may only be used as aids to maintain situational awareness or in emergency situations.

b. Military GPS Precise Positioning Service (GPS (PPS)) receivers must always be 'keyed' (cryptographic key loaded) when operated for all combat, combat support, and combat service support operations, and all exercises and training events. GPS (PPS) provides onboard systems with assured, secure, and encrypted positioning, velocity, and precise time/time interval (PTTI) data to establish a common geographic and time reference for fleet operations.

c. The Automatic Identification System (AIS) is widely used by the maritime community to increase situational awareness and enhance safety of navigation for vessels at sea. Ships will consult appropriate numbered fleet guidance in reference to AIS policy and will adhere to that guidance. Operators of AIS

must be qualified as listed with Table 2-A. Incorporation of AIS data into VMS may be used when available to increase situational awareness for the Navigation Team as listed in Chapter 4.

d. The use of RADAR is required to support safe navigation both in plotting and collision avoidance. As stated above, DoD approved systems must be used for RADAR navigation purposes. DoD approved systems are those approved by NAVSEA RADAR technical authority (e.g., SPS-67, SPS-73, BME, etc). Should ships be fitted with COTS RADAR (e.g., Ship's Force installed Furuno), care must be taken while in use and a DoD approved RADAR (if available) should be used to correlate its results.

e. The use of Inertial Navigation System (INS) as a source of positional data is essential, and operators must understand how the system works in order to properly account for positional differences when utilizing INS data to navigate. Navigation teams should familiarize themselves with the technical specifications of installed INS and understand the differences of system provided data while operating dependent or independent of GPS (PPS) information. On surface ships, INS is frequently operated in an automatic reset mode from GPS (PPS) to determine error. This means that INS systems are being updated every 8 seconds from GPS (PPS); thus, system updates go unnoticed by the operator due to the minimal errors generated in 8 seconds. When GPS (PPS) becomes unavailable or unreliable, an INS generated EP may have developed significant errors in source data and without the user's ability to correct for estimated errors. Therefore, if INS is being used as a position source, it is important to note the time elapsed since GPS(PPS) was available, the INS error information, the reason why GPS (PPS) became unreliable, and the mode of operation INS has been operating in. INS error information is available only in locations where the WSN equipment rack is installed. Additional watch standers may be required to determine and relay this information.

f. The NAV team will use all available resources to establish a fix per the guidelines in Table 3-A. Evaluation of inputs from GPS (PPS), RADAR, visual, DR/EP computations, and INS provides the basis for knowledgeable evaluation of the ship's position. Navigation Sensor System Interface (NAVSSI) provides GPS (PPS) positions as well as direct Estimated Positions (EP) which are generated by the Inertial Navigation System (INS) blended (weighted average of all position sources) solutions.

(1) The position source precedence is:

- (a) Open Ocean. GPS (PPS); INS (see note); celestial.
- (b) Coastal. GPS (PPS); visual, RADAR, or composite; INS (see note); celestial.
- (c) Piloting. GPS (PPS); visual, RADAR, or composite.
- (d) Restricted. GPS (PPS); visual, RADAR, or composite.

NOTE: INS position may only be used for up to 8 hours when GPS (PPS) is not updating INS. After 8 hours has elapsed, celestial is more accurate than INS and will, therefore, be used as the position source. Additionally, use of commercial GPS is authorized only in emergencies and only after the failure of all military GPS (PPS) receivers (including the DAGR).

(2) Each source of a fix has accuracy limitations. The navigation team must understand the amount of position error each fix source is subject to and apply that knowledge, combining multiple sources to obtain the best position. This type of application will also be useful in identifying a fix source

that has a significant error. Integrating as many sources of fix information as is reasonably possible will improve position accuracy and raise the confidence in data produced.

g. When using a geographic position table (i.e., DRT, DDRT, or CADRT), ensure position inputs or updates are provided from an accurate fix source or method.

h. Speed changes must be entered in the dummy log as soon as they are ordered when the dummy log is providing speed data to the navigation system (not applicable to LCS since it is not outfitted with dummy log). Continual adjustment of dummy log to reflect actual estimated water speed is critical to ensure water speed is accurately distributed to ship's systems and speed indicators. Accurate water speed information is necessary to maintain good DR solutions and serves as a velocity-damping source for INS systems.

i. In certain situations, such as trailing or locking a shaft, the QMOW cannot utilize the ordered speed, as the inherent error compounds over time. In open ocean, with sufficient availability of GPS (PPS) or other fixing methods available, the error may not become a problem. However, in piloting waters, or during a prolonged period where GPS (PPS) or other fixing methods are limited or unavailable, the DR will not allow the ship to maintain required positional accuracy or properly calculate set and drift. In these cases, the rules of DR speed cannot be strictly applied and must be modified by one of two methods, compensated and uncompensated.

(1) Compensated Revolutions Per Minute (RPM) Order. If a ship has a Trailing/Locked Shaft RPM Table, and orders up a specific RPM to offset the thrust lost by a trailing or locked shaft, then the DR will be laid out per the desired—not ordered—speed. For example, if the table shows that ordering RPMs for 18 knots with a trailing shaft is equal to both shafts rolling at 15 knots ordered, then the DR is laid out at 15 knots. This function is automatically accounted for by VMS on ECDIS-N certified ships.

(2) Uncompensated RPM Order. If the ship does not have a Trailing/Locked Shaft RPM Table, or does not order compensation RPMs, then the QMOW must DR for a lower-than-ordered speed. If time and equipment allows, fixing the slowing ship at three-minute intervals for 15 minutes after the casualty and then averaging the speed over the last six minutes can discover this lower speed. If there is not sufficient time, or the equipment does not support this fix interval, then the DR should be laid out for three knots less than the ordered speed until a more correct speed is deduced. Any error during this period will become part of the set and drift. This function is automatically accounted for by VMS on ECDIS-N certified ships.

j. The integration of all navigation sensors to derive a most probable position involves:

(1) Precise data collection, plotting, and analysis at the precise time set for fixing the ship's position as required by Table 3-A.

(2) Noting variation in fix clusters in successive plots and remaining alert to the first indication of accuracy degradation in the data.

(3) Flagging all geodetic positioning data provided to the users of navigation information with an assessment of fix quality utilizing Table 3-B.

Area	Distance from Land or Shoal Water	GPS FOM ⁶	Maximum Fix Interval ²
Restricted Waters ³	Less than 2 nautical miles	FOM ≤ 2	3 minutes ^{4,5}
Piloting Waters	2-10 nautical miles	FOM ≤ 4	3-15 minutes as conditions warrant ⁴
Coastal Waters	>10-30 nautical miles	FOM ≤ 6	15-30 minutes as conditions warrant
Open Ocean (Enroute Navigation)	Over 30 nautical miles	FOM ≤ 7	30 minutes or as conditions warrant

Table 3-A Fix Accuracy and Maximum Fix Interval Guidelines¹

NOTES:

- Fix definition is provided in Appendix G. Minimum accuracy standards for fixing the ship's position and the interval between these fixes are, to some extent, situation dependent.
- A good rule of thumb for fix intervals in open ocean/coastal waters is, "if a hazard to navigation falls within a circle whose radius is that of two DR intervals," then either the fix interval or ship's speed requires adjusting.
- Restricted Waters are defined as any waters less than the ship's Safety Depth (Navigation Draft + Safety Factor), and any position within two nautical miles (2nm) of these waters.
- All ships using GPS as the primary fix source are required to log Figure of Merit and to obtain a visual and/or RADAR fix at 3 times the intervals indicated (i.e., every nine minutes in restricted waters). If GPS FOM exceeds those limits listed in Table 3-A, GPS will not be used as the primary fix source, except in cases where no other fix source (excluding celestial) is available. For LCS, in order to display and record FOM on the corner of the VMS display, FOM1/FOM2 must be selected as the position source in order to display FOM. FOM1/FOM2 correlates to GPS1/GPS2. If FOM1/FOM2 is unavailable, revert to selecting GPS1/GPS2 and check FOM manually.
- CO's may increase fix periodicity as required by the navigational situation.
- For FOM conversion table see Table 3-B.

Figure Of Merit	Estimated Position Error		
	Meters	Feet	Yards
1	Less than or equal to 25	Less than or equal to 82	Less than or equal to 27.3
2	Greater than 25 Less than 50	Greater than 82 Less than 164	Greater than 27.3 Less than 54.7
3	Greater than 50 Less than 75	Greater than 164 Less than 246	Greater than 54.7 Less than 82
4	Greater than 75 Less than 100	Greater than 246 Less than 328	Greater than 82 Less than 127.3
5	Greater than 100 Less than 200	Greater than 328 Less than 656	Greater than 127.3 Less than 218.6

Figure Of Merit	Estimated Position Error		
	Meters	Feet	Yards
6	Greater than 200 Less than 500	Greater than 656 Less than 1640	Greater than 218.6 Less than 546.6
7	Greater than 500 Less than 1000	Greater than 1640 Less than 3280	Greater than 546.6 Less than 1093.3
8	Greater than 1000 Less than 5000	Greater than 3280 Less than 16400	Greater than 1093.3 Less than 5466.6
9	Greater than 5000	Greater than 16400	Greater than 5466.6

Table 3-B Figure of Merit Conversion Table

NOTE: Additional errors may be introduced by anomalies in the satellite/control station and hostile actions that result in range error above the operational tolerance. These errors are different from the predictable degraded accuracy described above. GPS integrity refers to the ability of the system to provide a timely warning to users when it should not be used for navigation. Integrity anomalies should be rare, occurring only a few times per year, but are critical for navigation. Integrity can be achieved by use of an algorithm internal to the GPS (PPS) receiver or integration with other on-board navigation sensors. The AN/WRN-6 does not have this capability and the capability is not enabled in NAVSSI Block 3 or Block 4 with inputs provided by the installed GVRCs. Continued use of visual and RADAR plotting provides the necessary integrity of the navigation system's blended solution.

k. Ensure charts and publications (electronic and paper) in use, or ready to be used, are the current edition certified safe for navigation by NGA and corrected or updated using all available information. Notice to Mariners, Local Notice to Mariners, Broadcast Notice to Mariners, NAVAREA IV and XII, HYDROLANT, HYDROPAC, HYDROARC, and Coastal Warning apply to paper charts and publications. Local Notice to Mariners, Broadcast Notice to Mariners, NAVAREA IV and XII, HYDROLANT, HYDROPAC, HYDROARC or Coastal Warning, and Vector Product Format Database Update (VDU) apply to electronic charts. For more detailed information about Navigation Warnings, refer to Chapter 6, paragraph 13. All charts covering the area of operations, regardless of scale, are compared to ensure that hazards to navigation are properly displayed and highlighted on all charts in use. In rare cases this may require transferring a possible hazard from one chart to another. When downloading electronic charts and publications via the NGA Web Site, users must ensure they are utilizing the CAC-enabled web site vice the public site.

(1) In the event the Navigator determines the largest-scale chart obtainable from NGA is insufficient for use during the transit, the Navigator must take action as early as possible to obtain NGA-sanctioned foreign produced charts. In the event a ship is unexpectedly tasked to pilot in waters not covered by sufficiently large-scale NGA charts, Navigators must make every effort to obtain corrections via immediate message (or VDU) from NGA for the chart being used. Navigators must verify the geodetic system on which the chart is based and ensure adjustments are made to the GPS equipment to match the chart datum. The Navigator must also determine the scale, units of measurement, and other pertinent characteristics of the chart prior to its use and take appropriate action to ensure the chart is safely and properly used.

(2) For non-ECDIS-N certified ships, ensure a correction tree consisting of the number and year of each Notice to Mariners from which corrections have been made, the date the correction was applied, and the initials of the individual making corrections must be entered in ink: On the paper chart(s), corrections will be annotated on the front, outside chart margins, such that the correction tree is visible

while in use; in publications, on the correction record page. If the correction is from a Local Notice to Mariner (LNM), NAVAREA IV and XII, HYDROLANT, HYDROPAC, HYDROARC or Coastal Warning, it should be annotated as such. Temporary changes will be annotated in pencil. This correction tree is a vital part of verifying chart corrections.

(3) For ECDIS-N certified ships, the verification of Digital Nautical Chart (DNC) libraries is done by querying each library in use to see which VDU has been applied. VMS 8 series operators can query the charts to verify information. VMS 9 series DNC updates are verified using the "Updates" tab of the "Chart Legend" subfield. For electronic publications (either downloaded or received on the Quarterly Publication Disk), the latest correction is automatically displayed via a pop-up window upon opening the cover page. Hard copy publication updates and corrections will be annotated on the corrections record page.

(4) Applicable Broadcast Notice to Mariners (BNTM), Local Notice to Mariners (LNM), and NAVAREA/HYDROLANT/HYDROPAC/HYDROARC/Coastal Warnings messages that are added to paper charts may also be added to VMS as Mariner Objects (VMS 7 or 8) or Manual Chart Updates (VMS 9x).

(5) Notice to Mariners (NTM) corrections are only designed to be used with Standard Nautical Charts (SNCs) (i.e. paper charts). NTM are not designed for application to DNC libraries and should not be manually added as objects into VMS.

(6) Units should forward requests for foreign charts and publications to USFF (N37) or COMPACFLT (N32) as appropriate. See Appendix E for contact information. NGA maintains a large database of foreign charts and publications for use as source material for the production of NGA products. If available from NGA, copies can be provided at no cost to the unit. NGA can also provide Notice to Mariners support. Units are only authorized to purchase foreign charts from alternate sources when NGA cannot provide an adequate chart in the format required in time to satisfy the operational requirement. Per reference (g), use of a foreign chart for navigation requires prior authorization.

l. Ensure all required navigation equipment is on board, maintained per PMS requirements (to include advisory messages), and operating properly. The status of equipment pertaining to the safe navigation of the ship will be reviewed by the Navigator. The appropriate department head will provide Estimated Time of Repair (ETR) for any navigation equipment that is not operating properly. CASREP is required for equipment that is not fully functional or not immediately corrected.

m. Ensure all navigation pre-underway or entering port checks are completed according to the ship's standard operating procedures, navigation department check-off lists, individual equipment operating procedures, Engineering Operational Sequencing System (EOSS), and Combat System Operational Sequencing System (CSOSS). Completion of EOSS or CSOSS checks will be documented in the Underway or Entering Port/Restricted Waters checklists, even if documented in another departmental checklist.

n. Determine gyrocompass/INS error at least daily underway or before any major evolution. Determine gyrocompass repeater errors, including benchmark checks, before getting underway, going alongside, or entering restricted waters and ensure they are checked against available navigational ranges. Enter changes to gyrocompass and repeater errors in the standard bearing record book and deck log, and

the magnetic compass record book if maintained, and ensure repeater errors are applied to all applicable LOPs.

(1) Gyrocompass repeater error must also be updated daily on all ship control and navigation repeater placards. At a minimum, this includes all bridge repeaters, all repeaters used by the Bearing Takers, CIC repeaters, and all aft steering repeaters, including the emergency steering pump station.

o. For ships equipped with an Inertial Navigation System (INS), the CO will establish the reset criteria and ensure the INS is configured per governing procedures to conform to those criteria.

p. Maintain close communication with CIC to:

(1) Be alert to the quality of the fix within the tactical evaluation to reduce errors in tactical warfare situations. For ECDIS-N ships the oversight of the ship's position that is fed to the warfare suite is still a critical role for the CIC watch team.

(2) Ensure any position data CIC requires is compared with the current combat system position. Any data that does not constitute a logical extension of previous fixes and estimated positions, in relation to time, must be brought to the attention of the Navigator and CIC Watch Officer to coordinate a resolution of the error (The Navigator will provide final verification and correction, if required.).

4. Requirements Prior to Entering Restricted Waters

a. The Navigator is charged with preparing a navigation plan and associated brief as a plan for safe and prudent passage, including piloting. The Navigator will brief all members of ship control stations before getting underway or entering port and restricted waters transits. This briefing will conform to Appendix B and must be conducted no more than 24 hours prior to the evolution. This plan will be reviewed and approved by the CO. Any changes from the printed brief and watch bill must be approved and initialed by the CO and included with the file copy. A signed muster sheet of all ship control personnel will be included as part of the signed navigation brief. The original signed navigation brief will be kept on board for a minimum of 12 months. In preparing this plan, consider the following in addition to the information identified in Appendix B.

(1) Consult the navigation publications identified in Appendix E, available port visit after-action reports (Navy Lessons Learned System (NLLS), see Appendix F), and other resources as appropriate. All references must be current editions and corrected to date.

(2) Determine, with concurrence of the CO and Chief Engineer, when the Engineering Restricted Maneuvering Doctrine will be initiated.

(3) Tide and currents will be determined for each reference station passed along the track. The use of tide or current sub-stations along the track will be determined as directed by the Navigator.

(a) The only electronic tide and current programs the CO may authorize are the NOAA tides and currents or NOAA tides and current online for U.S. waters (under the PRODUCTS header at this URL: <http://tidesandcurrents.noaa.gov/ports.html>) and the use of Admiralty Total Tide for all other areas of the world to compute tides and currents. For real time U.S. tide and current data utilize this NOAA

URL: <https://tidesandcurrents.noaa.gov/stations.html?type=Water+Levels>. A copy of graphs or printouts produced by any program will be maintained for twelve months as part of the signed navigation brief. Only these above systems are authorized for use.

(b) All tide and current data must be graphed. If not using an authorized electronic tide and current program, or the National Oceanic and Atmospheric Administration (NOAA) web site to print out a graph of tides and currents, graph tides using the "Quarter Tenth" method as described in the tide tables. Graph currents using the "Straight Line" method based on slack, high, and low water ratios. Record all tide and current computations in the navigation workbook or loose leaf binder. Ensure that all ship control stations (Pilothouse - CO, OOD, Junior OOD, Navigation Evaluator and Navigator; CIC - Piloting Officer and Shipping Officer) have copies of these products as described in Appendix B. If unable to access the NOAA web sites, the ship is authorized to use the Admiralty Total Tides program to produce tide and tide current data graphs to supplement those drawn manually using the data in the NOAA Tide Tables.

b. Depending on the system model installed (e.g., KVH MV103AC, KVH MV103DG, Navy No. 1 (7 1/2"), Air guide Model 66, Cylinder-Type, etc.), DFGMC PMS may be required 24 hours prior to mooring and anchoring, 24 hours prior to Replenishment at Sea or Underway Replenishment, 48 hours after getting underway, 48 hours after getting underway from a PMAV, or 48 hours after entering the degaussing range. While the applicable PMS MRC will be used to achieve a proper calibration, the purpose of this intentional calibration is to improve DFGMC accuracy and to prevent auto-compensation during the evolution. After the intentional calibration the DFGMC is taken out of 'CAL' or 'AUTO-CAL'. Completion of this intentional compass calibration will be logged in the deck log. The DFGMC heading displays will ONLY be MAGNETIC COMPASS HEADINGS without variation compensation. The only compensation which may be electronically applied to the compass is to correct for an incorrect alignment ('Alignment Offset' value) for a sensor not parallel to the centerline of the ship.

(1) At the CO's discretion, ships with both a conventional compass and DFGMC may place the conventional compass in lay-up in order to reduce maintenance requirements. Per the ship's gauge calibration instruction, an "Out of Commission" sticker will be placed on the compass in plain view of the helmsman. This may be on the compass face itself in order to obstruct compass reading.

c. All CNSF ships must meet the minimum requirements per reference (t) to safely get underway or prior to entering restricted waters.

5. Requirements While in Restricted Waters.

a. The navigation team must adhere, in so far as possible, to the following fundamental piloting principle: an optimum balance between accuracy and speed must be achieved while piloting. When operating in close proximity to shoal water or hazards to navigation, accurate, present and projected ship position information is required. In addition, such fix information must be updated as necessary to provide timely warning if the ship is standing into danger. This is particularly true in restricted waters.

b. The Navigator will ensure:

(1) The ship's position is fixed at an interval that ensures safe navigation (not to exceed intervals listed in Table 3-A). The interval between fixes may be adjusted by the Navigator as a function of water

depth, current, bottom contour, ship's draft, track, assessed position accuracy, width of channel, and other factors; or as set forth in the CO's Standing Orders and Navigation Bill.

(2) Set and drift are accurately determined. Set and drift will be determined at least once on each leg less than 1500 yards and every third fix for legs greater than 1500 yards. Set and drift should be computed more often if conditions dictate. Set and drift automatically calculated by an approved ECDIS-N satisfies this requirement.

(3) Every fix has a DR track properly labeled with course, speed, and times projected far enough ahead to include DR positions for at least the next two fix intervals, including beyond any turns encountered. The DR track of the recommended course is clear of navigational hazards and does not endanger the ship. ECDIS-N vectors meet this requirement when set to a time interval that is consistent with two next two intervals.

(4) Course changes take into consideration advance and transfer, set and drift, and the intersection of the DR and slide bar.

(5) A fix is plotted as soon as the ship is steady on a new course. The CO will be notified when a "no fix" situation occurs at the primary or secondary plot. Although rare, this may occur in ECDIS-N ships when GPS is unavailable. Refer to chapter 1, paragraph 3 for GPS-PNT operations in degraded or denied environment per reference (b). The CO will verbally acknowledge (i.e., "Very Well"). An immediate attempt to fix the ship's position will be made. If required fixes cannot be obtained, apply set and drift to the DR to obtain an estimated position (EP). Adherence to prudent navigation practices for the existing circumstances will be maintained until the ship's position is accurately determined.

(6) Visual, RADAR and composite fixes are obtained from fixed aids to navigation and charted structures rather than buoys, whenever possible. When buoy positions have been verified, bearings or ranges to buoys may be used to help clarify the navigation picture when no other objects are available. However, Navigators must be highly circumspect in their use of this practice.

(7) If a fix appears to be inaccurate, take another fix immediately to determine the ship's position. If the ship is still unable to establish an accurate fix after this, the Navigation Evaluator must make a recommendation to slow down, turn away from danger, or stop the ship until an accurate fix is obtained. Once an accurate fix is obtained, a second fix must be plotted as soon as feasible in order to verify that the newly regained fix is in fact accurate and not plotted in error. When ship's position has been verified as accurate, the Navigation Evaluator will make recommendations to proceed with navigation operations. Ensure all recommendations are logged in the Deck Log.

(8) The fathometer is energized and recording when in restricted waters. Whenever possible, the fathometer will be set to coincide with the depth scale of the chart being used. Whenever soundings are less than the minimum value(s) predicted, notify the Navigation Evaluator immediately. Compare soundings with charted depths on each fix and report to the OOD. Log all soundings in the standard bearing book or ship's position log. Figure 3-1 shows the relationships of drafts, depths and soundings; Figure 3-2 must be posted at the fathometer displays and ship control stations. Ensure Figure 3-2 is adjusted for expected the tidal conditions.

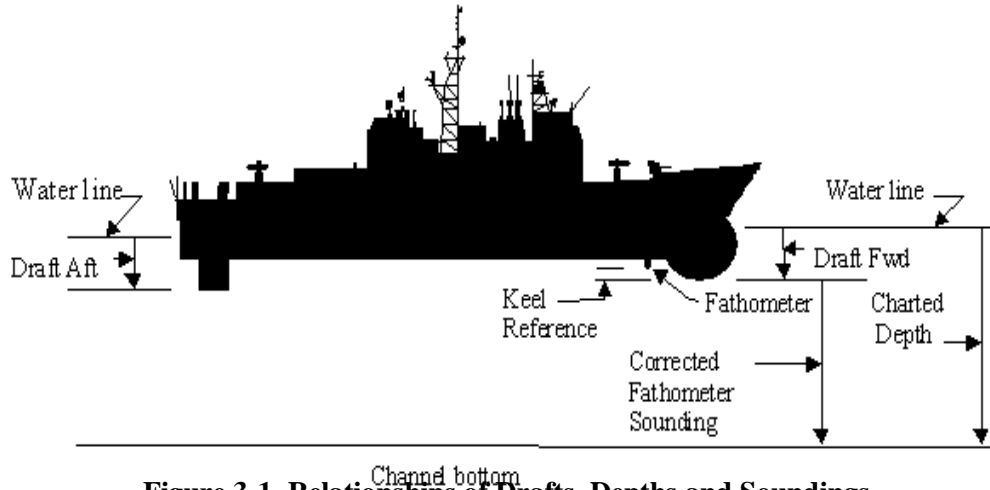


Figure 3-1 Relationships of Drafts, Depths and Soundings

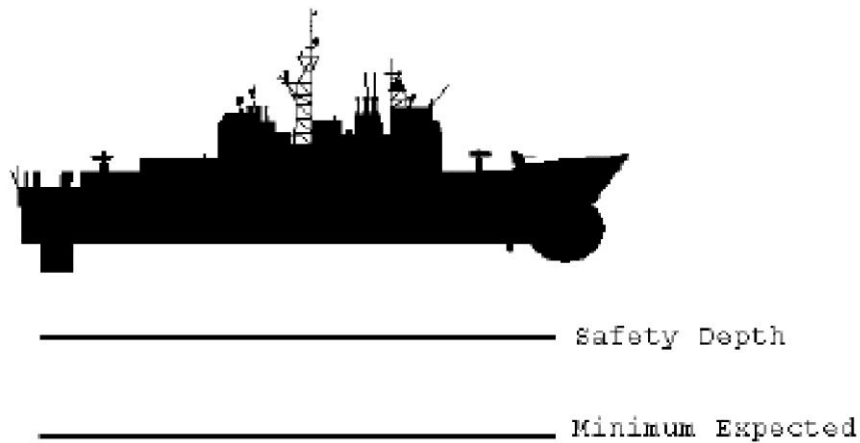


Figure 3-2 Safety Depth/Minimum Water Depth Diagram

(9) Accurate records and logs are maintained. Complete reconstruction of the ship's track, orders to the helm and lee helm, and recommendations made by the Navigator to the CO, OOD, and CONN must be possible at any time. Records and logs can be used when evaluating the performance of the navigation team, assessing the cause(s) of navigation incidents, and training.

(10) Use of checklists in navigation evolutions (e.g., Low Visibility, Entering/Leaving port, Swept Channel) is mandatory. Checklists must be kept for twelve months after completion of the evolution. See sample checklists in Appendix C. Checklists should be tailored to the ship and inserted as enclosures to the ship's Navigation Bill.

(11) Pilots, as advisors to the CO and the navigation team, should be made familiar with ship's characteristics and planned navigation track prior to beginning the proposed transit. A 'Pilot Card' with current information, including a basic ship diagram showing dimensions in feet, yards and meters, is extremely useful. Items for discussion with a Pilot should include:

- (a) Maneuvering characteristics of the ship and lowest depth projection.
 - (b) Allowable deviation from track.
 - (c) Unpublished hazards to navigation.
 - (d) Bridge-to-Bridge radio communications.
 - (e) Port requirements for Automatic Identification System (AIS).
 - (f) Ship-specific piloting and conning procedures.
 - (g) Use of tugs.
 - (h) Material casualties that may affect maneuverability of the ship.
 - (i) Material condition of ship (i.e., oil leaks, steering system, navigation sensors, ECDIS-N, AIS, etc.).
 - (j) Safe speed for all legs of proposed transit.
 - (k) Correction status of charts (electronic and radar).
 - (l) Types of RADAR used
- (12) Ensure the DFGMC is placed in “Cal Off” mode.
- c. Special measures during low visibility. Carry out CO’s Standing Orders for low visibility.

6. Requirements While in the Open Ocean

- a. Set and drift will be computed and logged in the Ship's Deck Log every hour. A recommended course to compensate for set and drift will be given by the Navigator or the QMOW. Logging ECDIS-N calculated set and drift for ECDIS-N certified ships meets this requirement.
- b. At least hourly, compare all fix sources (with exception of celestial) and determine the ship's position. At least hourly, or after each fix, report this navigation information to users such as CIC to allow them to validate their tactical system position.
- c. If weather permits, determine gyrocompass error by azimuth or amplitude of the sun or other celestial body at least once daily.
- d. Make deck log and weather log entries for any significant change in weather per references (u) and (v).

e. Conduct compass comparisons between the bridge gyrocompass/INS repeaters and magnetic compass every time a new course is set (over 10-degrees) and at least every 30 minutes, recording comparison data in the magnetic compass record book or deck log.

7. Dead-stick Moves. Ships equipped with an Emergency Navigation Laptop (ENL) will have it in use as the primary plot, with GPS as the sole fix source and no fix comparison (e.g, visual, radar, etc.) requirement. Refer to reference (t) for more information.

8. Small Boat Navigation. Rigid Inflatable Boats (RIB) carried onboard U.S. commissioned vessels must have a means of determining position in order to proceed with requirements listed in references (g) and (l). RIBs are not required to utilize ECDIS-N or Electronic Charting Systems (ECS); however, each small boat must have a means of receiving GPS position. When closing shore, a chartlet or electronic charting means must be available to support safe transit.

9. Validation of Reference Parameters.

a. The proper functioning of many, if not all, of a ship's navigation sensors depend on the correct implementation of reference parameters. In its simplest form, this refers to setting the AN/UQN-4/4A/10 'Keel Reference Switch' thumbwheel(s) to the proper value. At the most complex level it involves accounting for the physical separation of the GPS antennas (Lever Arm Offsets) and the milliseconds of delay as the signal travels from the antenna to the receiver. A failure of these parameters to be properly loaded into the systems can cause significant, potentially dangerous, errors.

b. The Navigation Certification (NAVCERT) Program managed by Naval Sea Systems Command (NAVSEA) per reference (w) provides the basis for validating all of these critical parameters. Similar to the Navigation Light Certification, a complete NAVCERT will verify the correct values for all Own Ship's Reference Point (OSRP) values, which include, but are not limited to, all lever arm and timing corrections. Navigators and EMO's shall verify equipment operation and that ship's NAVCERT is valid.

c. While the original NAVSEA05 NAVCERT and SPAWAR end-of-test paperwork will remain with the ship's Combat Systems organization smooth log, a copy will be kept by the Navigator for ready reference.

d. Ships not meeting the five year NAVCERT requirement will be required to submit a DFS request to TYCOM with required data package to NAVSEA 05 per reference (w).

10. Map Account Maintenance.

a. Commands that require any NGA geospatial product (e.g., maps and charts) distributed by DLA must maintain at least one map account on file with the DLA Mapping Customer Operations (MCO) to receive the USFF and COMPACFLT geospatial product allowance material required by references (h) and (i), to manage unit subscription requirements and to requisition NGA products. Each map account must be verified annually in the DLA Mapping Enterprise Business System (MEBS). Access to MEBS is obtained via the DLA Account Management and Provisioning System (AMPS). Units should maintain two custodians for each map account at all times. For accountability and safety of navigation concerns, the Leading Quartermaster should always be the primary account custodian. The secondary or alternate account custodian should come from one of the other end-user divisions (e.g., Intel, CIC/CDC, Carrier

Air Traffic Control Center) and have a PRD at least 12 months apart from the primary account custodian. Failure to revalidate the account in MEBS annually will result in account suspension and could impede the shipment of NGA products to a command, including nautical and aeronautical charts, Flight Information Publications (FLIP) and targeting material required for strike operations. See Appendix E for additional information.

b. The primary account custodian should ensure that a yearly chart inventory is conducted by downloading the command's map subscriptions. Ships can also add, delete, or change ship-controlled subscription requirements. Minimum chart allowances established by references (h) and (i) cannot be changed online.

c. Each ship needs to ensure that it is using only an "R" (PACFLT) or "V" (USFF) Department of Defense Activity Address Code (DODAAC) account. "N" accounts are used for shore or new construction ONLY, and must be converted over once the ship is commissioned. Contact Mapping Customer Operations, Defense Supply Center Richmond for assistance.

d. COMLCSRON ONE and COMLCSRON TWO N7 Navigation Training Team (NTT) will maintain a current map account with DLA MCO for all hulls and maintain the requirements as listed above.

CHAPTER 4
SUPPLEMENTAL POLICIES, REQUIREMENTS, AND PROCEDURES

1. General. This chapter provides guidance on additional policies, requirements, and procedures that supplement and amplify those contained in Chapters 2 and 3 and reference (k). Some items may not apply to certain versions of VMS.

a. Once an approved ECDIS-N is installed, the ship must complete the certification process. Specific steps are required for TYCOM authorization before a ship can operate with ECDIS-N as the primary navigation plot per reference (k). ISICs must notify TYCOM immediately if any ship will not meet certification requirements listed below. TYCOM authorization must be received before a ship can operate with ECDIS-N as the primary navigation plot.

b. The following is a list of documentation and steps to be taken to achieve full ECDIS-N certification, which must be completed within a six-month timeframe relative to equipment Navigation Certification:

(1) Possess OPNAV-approved platform configuration message. This message will be sent by CNO WASHINGTON DC.

(2) Complete Material Navigation System Certification (NAVCERT). NAVCERT will be completed within 6 months from the date of ECDIS-N installation. This certification is conducted by SPAWARSYSCEN ATLANTIC. For ECDIS-N Certified ships, after any change to the ECDIS-N baseline configuration and upgrade to the navigation system, an appropriate ECDIS-N configuration approval and NAVCERT may be required per references (k) and (w). For major upgrades to ECDIS-N which affect user or operator training (e.g., VMS version update, etc.), a navigation assessment will be conducted by the ISIC per Appendix A of this instruction and all watch standers at the affected stations will have to requalify on the new configuration.

(3) Complete an ATG or LCSRON in-port ECDIS-N Limited Training Team (LTT). The in port LTT verifies administrative readiness items to ensure a successful ECDIS-N certification process and must be complete prior to requesting an ECDIS-N 180-day interim certification. The LTT will review qualifications and proficiency and ensure the ship is on track to pass the ISIC Navigation Assessment. The following items are reviewed during the in-port LTT:

(a) OPNAV approved ECDIS-N configuration (correct hardware and software version) is installed with a valid or current NAVCERT. Installation of any software on any ECDIS-N node or modification of any ECDIS-N internal computer components or ECDIS-N calibrated monitors by any agency other than the In-Service Engineering Agent (ISEA - NSWC, Philadelphia) may invalidate the hardware or software integrity of the shipboard installation and impact the approved configuration. Unauthorized system modifications may invalidate authorization for use of ECDIS-N as the Primary Navigation Plot, which will require the ship to be placed in restricted operations until completion of new NAVCERT. Keyboards must be backlit and dimmable on the bridge, and all keyboards and pointing devices must fit in any provided storage locations. The ISEA is available to assist the ship with determining and executing the appropriate level of repair to restore the system to the 'as approved' status. ISICs will keep appropriate TYCOM informed of the problem and resolution.

(b) All VMS and NAVSSI advisories for specific ship build as maintained by the Navigator and checked for incorporation.

(c) A draft ECDIS-N Navigation Bill prepared and ready for CO's signature. Once final TYCOM authorization is granted to navigate using ECDIS-N, the ECDIS-N Navigation Bill will be signed and will supersede the traditional navigation bill. For LCS, the squadron Navigation Bill meets this requirement.

(d) Proper number of VMS operator school graduates - per Table 2-A and all notes.

(e) A CO-approved navigation watch bill with PQS or JQR qualified watch standers to include Seamanship Training Team (STT) members, including applicable requalification for newly configured or modified equipment.

(f) Operator level of knowledge (LOK) verified per check list provided in Appendix A.

(g) Verify ECDIS-N voyage plan is per Voyage Planning/Piloting Preparation Checklist

(4) Obtain an ECDIS-N 180-day interim authorization. The interim authorization request is originated by the ship, endorsed by the ISIC, and approved by TYCOM. The interim authorization allows a ship to operate with ECDIS-N as the primary navigation plot for up to 180 days during which ships are expected to pass an ECDIS-N Squadron/Group Staff Navigation Assessment. Once an ECDIS-N 180-day interim authorization is granted, the following requirements apply:

(a) A paper plot will be maintained separately in CIC and will serve as a safety back up. Additionally, CIC will plot ship's position using GPS (PPS) and RADAR lines of position and compare position with the navigation primary plot. The CIC Watch Officer will consult the CIC safety paper plot as necessary to ensure safe navigation.

(b) On the bridge, paper chart requirements are per non-ECDIS-N ship guidance as set forth in this section. Paper charts will be on station, updated, and ready for safe navigation prior to getting underway and prior to entering restricted waters. The navigation team is required to plot one fix on the paper chart and compare it with the ECDIS-N primary console plot. If the fixes match, additional plots on the paper chart are not required and ECDIS-N becomes the primary plot on the bridge. If there is a failure of the ECDIS-N or the CO is not comfortable with the ECDIS-N plot, the ship will revert to requirements for maintaining the primary navigation plot using paper charts until the casualty or situation has been resolved.

(c) On ships equipped with an Emergency Navigation Laptop (ENL) or without a chart table, the ENL will serve as the back-up plot until certified.

(5) Complete an ATG or LCSRON underway ECDIS-N LTT. During this LTT, a paper plot must be in place in CIC as a safety back-up (except ZUMWALT and LCS class ships). This LTT will focus on the training of the ship's navigation team using ECDIS-N as the primary plot in restricted waters.

(6) Complete ISIC Navigation Assessment. This will be done after the ATG or LCSRON LTT. The ISIC will conduct a Navigation Assessment utilizing Appendix A. For initial authorization using ECDIS-N, Navigation Assessment must be completed within 6 months from the date of the NAVCERT.

(7) TYCOM Authorization. Upon satisfactory completion of the ECDIS-N Navigation Assessment, a ship's ISIC will send a message to the TYCOM N7 recommending unrestricted navigation operations using ECDIS-N as the primary navigation plot. Once a ship is authorized by TYCOM to use ECDIS-N as its primary navigation plot, the authorization is required to be maintained for the life of the ship. All follow-on Navigation Assessment messages will be approved by the ISIC. At no time will control stations (Bridge and CIC) revert to paper charts as the primary means of navigation. In the case of loss of all VMS nodes on the bridge, the ship is authorized to utilize the ENL as primary plot. A loss of GPS is not considered a loss of VMS.

c. If a ship fails navigation assessment while under the ECDIS-N 180-day interim authorization, the interim authorization will be automatically cancelled and the ship will revert to paper charts as primary and secondary plots. Another ECDIS-N 180-day interim authorization will not be approved until the ship completes an additional ATG or LCSRON ECDIS-N LTT and the ISIC provides an updated plan to certify.

d. No interim authorization extensions will be granted. If not assessed during the term of the ECDIS-N 180-day interim authorization, the ship must revert to paper charts as primary and secondary plots. Another interim authorization will not be approved until the ship completes an additional ATG or LCSRON ECDIS-N MOB-N LTT and the ISIC provides justification for inability to certify under the initial interim authorization.

2. Policy.

a. For ECDIS-N Certified Ships. The CO is responsible for establishing the standards for ECDIS-N set-up and use, to include, but not limited to:

(1) Own-ship Safety Zone Configuration. The Own-ship Safety Zone is a three dimensional box constructed around Own-ship and extended ahead of Own-ship for a specified look-ahead time. The configuration is done through the ECDIS-N/VMS SYSTEM: SAFETY CONFIG menu, from which parameters for Own-ship Safety Zone may be set. The minimums are:

(a) Look Ahead Time: 6 minutes.

(b) Safety Depth: Equal to the Navigation Draft plus a Safety Factor determined by the CO. See Table 4-A for proper metric values.

(c) Safety Height: Value equal to the masthead height plus 25 feet.

(d) ALARM ON NEW DANGERS: Always selected 'ON' (VMS 7.X/8.X ONLY)

(e) The Safety configuration settings should be checked as part of a watch turn over item.

(f) The VMS software allows the user to select a safety depth value that results in highlighting of specific depth curves available in the DNC and TOD libraries. If the safety contour value selected by the operator is not contained in the DNC or TOD, or if the safety contour in use becomes unavailable due to a change in the source data, the safety contour defaults to the next deeper depth curve. At all times, the safety contour shown is the depth curve specified by the operator or the next deeper depth curve, if the specified depth curve is not available. To ensure VMS highlights the desired safety contour, the VMS user must enter the desired safety depth in meters equal to the desired safety depth in feet, per the below table:

MS SAFETY CONTOUR METRIC CONVERSIONS	
1 foot (ft)	=0.3048 meters,
1 m	=3.281ft,
20ft	=06.1m,
21ft	=06.4m,
22ft	=06.7m,
23ft	=07.0m,
24ft	=07.3m,
25ft	=07.6m,
26ft	=07.9m,
27ft	=08.2m,
28ft	=08.5m,
29ft	=08.8m,
30ft	=09.1m,
31ft	=09.4m,
32ft	=09.7m,
33ft	=10.0m,
34ft	=10.3m,
35ft	=10.6m,
36ft	=10.9m,
37ft	=11.2m,
38ft	=11.6m,
39ft	=11.9m,
40ft	=12.2m,
41ft	=12.5m,
42ft	=12.8m,
43ft	=13.1m,
44ft	=13.4m,
45ft	=13.7m,
46ft	=14.0m,
47ft	=14.3m,
48ft	=14.6m,
49ft	=14.9m,
50ft	=15.2m.

Table 4-A VMS Safety Contour Metric Conversions

(2) Determination and reporting of the minimum sounding(s) expected along a restricted water track outside of a maintained channel (reporting of a sounding inside a maintained channel is necessary only if the sounding is less than the channel charted depth). This may be done through a Mariner Object Point, Line, or Area to highlight the sounding.

(3) Procedures for approving Navigation Plans. The ECDIS-N software provides for CO approval of Voyage Plans and PIM Plans, and of the chart portfolios and layer portfolios that are associated with them. In addition to the individual approval of these plans and their components, the VMS also provides for overall review and approval of plans and portfolios for use during a specified time period. The overall approval status of the system is visible at all times (except for VMS 9.1, in which approval status is not visible), in the approval status indicator at the top of the main menu. The indicator is green when the status is APPROVED, and it is red when the status is UNAPPROVED. In either case, the operator can obtain more information about the overall system approval status by selecting the indicator.

(a) Utilizing similar procedures as with paper charts, the CO must clearly establish who is required to review and then RECOMMEND the Navigation Plan and included Chart Layer(s), Chart Portfolio(s), Voyage Plan(s) and PIM Plan(s) for CO's approval. On CNSF ships, this process must include the XO. Standard ECDIS-N installation includes a QM, QMC, Navigator, and XO accounts with RECOMMEND authority; only the CO account has APPROVAL authority. These accounts are set up through a Windows Operating System function, and may be added to (i.e., OSC or CDO Underway account) or customized (i.e., to allow the Navigator to approve Open Ocean Voyage Plans). The Navigator and a generic CDO Underway (CNAF ONLY) login will have APPROVAL authority, with the specific procedures for using this authority detailed in CO's Standing Orders or the ship's Navigation Bill. It is highly recommended that ships visiting ports have voyage plans approved for leaving port upon arrival in case of emergency sortie. Likewise, ships in homeport during a ready-duty status should have voyage plans approved in the event of emergent underway tasking.

(b) At a minimum, all Restricted Water transits must be APPROVED by the CO. In case of emergency sortie, the XO and a generic CDO UNDERWAY (CNAF only) login will have APPROVAL authority, with the specific procedures for using this authority detailed in CO's Standing Orders or the ship's Navigation Bill. This requirement corresponds to the paper charts the CO has to sign. The CO may designate APPROVAL authority to the Navigator for all other transits to avoid having UNAPPROVED routinely appear.

(4) Procedures for the use of the Tactical Layer (Not applicable to VMS 9.1 systems).

(a) The Tactical Layer is a special layer that may be modified at any time, and is approved by the CO. This layer is always used for safety checking. Each ship may have specific items placed in this layer as authorized by the CO.

(b) At a minimum, Mariner Objects or Manual Chart Updates which are established for navigational safety reasons (e.g., a safety buffer around Bishop's Rock, TACTS towers, Chesapeake Light, or Voluntary Traffic Separation Scheme (VTSS)) should be placed on the Tactical Layer.

(5) Procedures for verifying chart and track changes after application of VPF Database Updates (VDU).

(a) VDUs apply corrections to the base DNC Library, but these changes are not highlighted.

(b) At a minimum, each Navigation Team needs to follow post-update plan validation procedures to ensure that changes have not adversely impacted the current track, or any currently approved Navigation Plan (e.g., the entering or departing homeport plans) or component. The results of this review will be reported to the CO; on CNSF ships, this process must include the XO.

(6) A tailored display set up to include alarm settings must be established and approved by the CO. Each ECDIS-N display has the ability to load a different display feature set. Pre-evolution checklists must include verification of the displayed feature set, required at each ECDIS-N display per ships navigation bill.

(a) Appendix H or I (as applicable) shows the minimum display requirements. The CO may establish more restrictive settings when desired, but the ship's settings must be included as an enclosure to the ship's Navigation Bill. The 'Default' display feature set will be converted to the settings in the 'Restricted' display feature set to prevent losing important features during restricted water transits. To accomplish this, open the Feature control panel and select 'Default.' Use Appendix H or I (as applicable) and Navigation Bill to tailor the set to 'Restricted', then save the set. The new settings will overwrite the Default settings. Ships will also establish distinctive 'Piloting,' 'Coastal,' and 'Open Ocean,' settings to follow.

(b) Watch Standers (i.e., OOD, JOOD and QMOW) must verify VMS sensor position and sensor alignment at every watch turnover and prior to entering Piloting or Restricted Waters.

(7) Procedures for loading, starting, ending, and changing Navigation and Voyage plans.

(a) The current version of ECDIS-N software allows several voyage, route, or PIM plans and chart or layer portfolios in each navigation plan. However, an item in an APPROVED plan cannot be modified without requiring re-approval, and anything in a loaded navigation plan cannot be modified. Charts being modified through the VDU process are an exception. In practice this means that each navigation plan will contain only as much as necessary to execute the plan, giving the navigation team the flexibility to make changes up to the CO's approval deadline. Additionally, the software does not append follow-on tracks, therefore there will be a practical requirement to end a plan, unload the navigation plan, then load and start the next navigation plan. To simplify this process, each voyage plan must have at least one leg (the last two waypoints) in common with the first leg (first two waypoints) of the next plan.

(b) The CO must designate who is authorized to start, stop, load and unload a navigation plan, and designate the requirements and procedures for changing a current navigation plan, or any of its components, in the ship's navigation bill.

(8) Fix source precedence and use must be per Chapter 3 of this instruction.

(9) Appropriate fix intervals at anchor.

(a) A visual, RADAR, or composite fix must be taken at least once an hour at a minimum or upon receiving a position alarm (e.g., Position Uncertainty- "POS discrepancy between [sensor a] & [sensor b]"; position sensor failure/timeout- "Timeout: Position Manager GPS-1"; Anchor Drag- "Anchor Drag Possible – Check Position"; etc.).

(b) The ECDIS-N software considers water depth when calculating the swing and drag circles, such that the length of chain is the hypotenuse of a right triangle. Thus, its drag circle is smaller than what is normally plotted on a paper chart, and will generate an alarm as the ship approaches the edge of the drag circle.

(10) CO's Ready List of SNC or DNC Libraries and Publications.

(a) There is not a requirement, nor is it recommended, for all libraries on a DNC to be loaded at the same time; this helps preserve the speed of the ECDIS-N. For this reason, there is also a need to remove libraries as the ship moves into a new operating area for a length of time, such as an overseas deployment.

(b) Load only the charts required for projected ship's operations; other charts must be available and already corrected if needed. This includes: Harbor and Approach libraries for the ship's homeport and surrounding waters; local Coastal libraries; local General libraries; and Tactical Ocean Data (TOD) overlays for the local OPAREAS. Proper management of the ECDIS-N chart catalog is a critical part of maintaining a healthy system.

(c) Vector Product Format Updates (VDUs) must be applied on a weekly basis for the area(s) of the ship's operations. Procedures for applying VDU are listed in applicable VMS operator's manuals and must be applied correctly so that it does not cause system degradation. VDUs are available for download (one-quarter of all DNCs are updated weekly) or obtained off the monthly VDU CD-ROM and applied prior to any use of a DNC Library. Monthly CD-ROM updates should be used as a last resort when the ship has no internet connectivity, as they are generally time-late. Until the most recent VDU

available has been applied to a DNC library, it will not be used except in an emergency. For VDU application and download instructions, see Appendix E. If connectivity issues prevent receiving a recent VDU, the DNC may be utilized for planning but the problem must be briefed to the CO, and the ship must make every effort to get the missing VDU prior to actual DNC use. If the ship is not able to obtain the VDU in time, the CO must be briefed and a Deck log entry made detailing the issue. Bottom line, application of VDUs is mandatory.

(11) Integrated Plot. When able, ships must integrate both AIS and RADAR into VMS, creating an integrated plot for enhanced situational awareness. This will allow critical watch stations to see an overlay of AIS and RADAR tracks into the VMS system. Adhering to NAVSEA or ISEA advisory messages when configuring integrated plot settings will prevent system degradation.

(a) Guidance can be found via the Sailor-to-Engineer Web site:
[HTTPS://HELP.PHDNSWC.NMCI.NAVY.MIL/SITES/S2E/PAGES/DEFAULT.ASPX](https://help.phdnswc.nmci.navy.mil/sites/s2e/pages/default.aspx).

User can request a PHD NSWC web account at the following address:

[HTTPS://ACCOUNTS.PHDNSWC.NMCI.NAVY.MIL/UDEFAULT.ASPX](https://accounts.phdnswc.nmci.navy.mil/udefault.aspx).

A valid common access card (CAC) or smart card with an email certificate is required. For further assistance getting access to the advisories, send a digitally signed email to ITHELP.NSWCPHD.FCT@NAVY.MIL or call DSN 296-8191 OR COMM (805) 228-8191

(12) Non-navigation procedures to support ECDIS-N.

(a) The CO must designate the appropriate command relationships and responsibilities between the CSO or OPS, EMO and Navigator in the ships navigation bill. They must work together to keep all navigation-critical systems operational at all times.

(b) ECDIS-N software, computer, LAN, display and equipment troubleshooting and maintenance is partially supported through PMS (i.e., Cruiser IBS PMS 5600/020); however, there are known basic maintenance actions which must be done regularly which are listed in the technical manuals (Administrator's Guide) provided by NSWCCD Philadelphia. At a minimum, the hard disk must be defragged at least quarterly, and the CPU and display fans and filters, as well as the CPU, must be cleaned quarterly.

(c) Besides the ECDIS-N playback logs, both the NAVSSI and WSN-7 CDU have the capability to log navigation source data. Investigations have shown that these alternate logs are valuable in troubleshooting navigational problems, and can provide back-up in the event of loss of ECDIS-N logs. The CO must establish when this additional logging will be required and the minimum frequency and method of backing up these additional logs.

b. Ships not authorized for unrestricted navigation operations using ECDIS-N must maintain a paper plot.

3. Requirements. The Navigation Team must satisfy the following additional requirements while the ship is underway:

a. For ECDIS-N Certified Ships:

(1) Use of Digital Charts.

(a) DNCs produced by NGA are the primary approved charts for ECDIS-N use. All DNC libraries have been certified 'Safe for Navigation' by NGA. DNCs are 'LIMDIS' and when no longer required, must be destroyed. The Navigator must inform NGA of any issues with a new DNC as soon as they are discovered. Ships with VMS 9.3 or above are also authorized to use ENC (S-57) charts issued by NGA as part of a standard worldwide portfolio, including ENC produced by NOAA or foreign hydrographic offices. Per reference (g):

1. Electronic Navigational Charts (ENCs) produced by National Oceanic and Atmospheric Administration (NOAA) are authorized for use in U.S. territorial waters.

2. Use of ENCs from nations that have a formal bilateral agreement with NGA, are authorized for use without prior approval in the territorial waters of those partner nations. Bilateral partner nations include the United Kingdom, Canada, Australia, New Zealand, and Japan.

3. For all other areas of the world, if planning to operate in an area where NGA coverage is considered inadequate or non-existent, then authorization to use foreign nautical charts, or ENC as the primary source of navigation must be requested via the operational chain of command at least 45 days prior to the scheduled operation. The request must be approved by the supported Naval Component Commander (NCC). Requesting commands must inform COMPACFLT (N32) or COMUSFLTFORCOM (N37), as appropriate, on the initial request to their chain of command. NCC coordination with the NGA Maritime Safety Office, to identify the best available chart, to review it for suitability and to coordinate Notice to Mariners (NtM) support, is recommended prior to granting approval.

(b) Tactical Ocean Data (TOD) provides additional data for Navy-specific requirements, and comes in different levels. TOD data must be displayed with the appropriate DNC library(s), thus the final display will be both DNC and TOD. There are two types which are applicable to surface ships:

1. TOD0. OPAREA, Range and Exercise charts (AOA, XNR). TOD0 was developed to provide a digital portrayal of hardcopy operational area charts as an overlay to the DNC. The concept is to display the proper scale DNC library(s) (usually DNC Coastal libraries) and then the appropriate TOD overlay. TOD0 data cannot be displayed on any navigation system as a sole entity. As of January 2018 there are 12 DNC Regions with TOD0 sets.

2. TOD2. Bathymetric Navigation Planning Charts (BNPC). TOD2 represents NGA's BNCP series. In order to provide a seamless set of Bathymetric data, NGA combined existing TOD1 (Bottom Contour (BC) and TOD3 (Shallow water bathymetry) with TOD2 for a single merged database. TOD2 was developed to portray the seafloor configuration. ASW platforms may desire to utilize TOD2. As of January 2018 there are 29 DNC Regions with TOD2 sets.

(2) Reference (k) requires that an ECDIS-N provide a standard legend that includes the scale of the display. The operator is given the ability to use intermediate display scales or zoom in between scales with an indication whenever the information is displayed at a larger scale than that contained in the DNC or TOD. The navigation team must exercise caution when using the zoom in feature to prevent possible misinterpretation of the inherent accuracy of the data presented in the over scale display.

(3) Rigorous maintenance and update of digital charts, portfolios, layers, manual chart updates, and mariner objects are significant requirements for the success of this system.

(a) All objects, layers, and portfolios must be distinctly named. Adoption of a consistent naming convention will simplify reviews and allow for rapid building of layers. Each ship's navigation bill must specify their naming conventions.

1. A mariner object or manual chart update may have a different name and label, allowing a dual-use NAVAID to be named 'FWD RNG' and Labeled 'RDR 2'.

2. The paper chart number is usable in the class field.

(b) Applicable VMS Advisories will be reviewed upon receipt and incorporated into the Navigation training plan. ISEA advisories for each version of VMS are sent via message traffic and can be viewed at web site: <https://help.phdnswc.nmci.navy.mil/SITES/S2E/pages/default.aspx>
Users can request a PHD NSWC web account at the following address:
<https://accounts.phdnswc.nmci.navy.mil/udefault.aspx>
Valid Common Access Card (CAC) or smart card with an email certificate is required. For further assistance, send a digitally signed email to ITHELP.NSWCPHD.FCT@NAVY.MIL or COMM. (805) 228-8191 or DSN 296-8191.

(c) Objects added as a chart addition (i.e., Notice to Mariner correction) automatically display with the chart, and only with that chart, and are independent of display layers.

b. For Ships not authorized for unrestricted navigation operations using ECDIS-N:

(1) Properly maintain the ship's DR. The Navigation Team must rely upon DR as the foundation for maintaining an acceptable estimate of the ship's position between fixes.

(2) The following are general rules used in constructing and maintaining the Navigator's DR plot:

(a) Plot a DR position at least every hour on the hour while in open-ocean.

(b) Plot a DR position at every course change.

(c) Plot a DR position at every speed change.

(d) Plot a DR position when obtaining a fix or running fix.

(e) Plot a DR position when obtaining a single line of position.

(f) Label each fix with course, speed, and time. Draw a new course line from each fix or running fix as soon as it has been determined and plotted on the chart. This is accomplished whether the ship is on track or not. The DR plot should cover at least the next two fix intervals; ECDIS-N generates this automatically but the display must be properly set up, see Appendix H and I.

(3) When insufficient data is present to fix the position of the vessel accurately, generate an estimated position (EP) by combining incomplete data from a variety of sources. The estimated position may combine the DR position with a single line of bearing, set and drift, tactical data, or represent a combination of these and other factors. Since DR positions are plotted for ordered courses and speeds and do not compensate for known values or tactical characteristics of the ship, their relationship to the geodetic position may not always be accurate. To reduce the magnitude of error between the DR position and the geodetic position, the DR plot must be refined during the interval between fixes with a plot of Estimated Positions, utilizing the following guidelines:

- (a) Use the largest scale chart practical to enhance plotting accuracy.
- (b) Include the last DR position in any calculation leading to an estimate of the ship's position.
- (c) Combine all available LOPs of questionable quality with DR position data in the absence of a fix.
- (d) Determine set and drift and apply this data to current work on the Navigator's plot.
- (e) During high speed maneuvering, compensate for tactical characteristics, interpolating for other than listed speed and rudder angles.
- (f) Use large-scale charts, or chart libraries and TOD if appropriate, and the fathometer, to further develop the ship's estimated position through Bottom Contour Advancement.

(4) The Navigator will ensure the following paper chart preparations are accurately plotted on all tracks and identical on all charts and displays used for navigation, including those used by CIC (sample restricted waters and open ocean checklists are available in Appendix C).

- (a) Turn bearings in true and relative, turn ranges (in yards), and slide bars; allowing for the ship's advance and transfer tactical data.
- (b) A notation for each turn stating, "Turn based on ____ knots and ____ rudder," combination to ensure that the plotted advance and transfer is known. If all turns on a chart use the same combination, only one clearly legible notation is required.
- (c) Bridge and CIC will indicate chart shift points (on paper charts) so both plots are not shifted at the same time and so they do not require shifting during, or at the time of, an impending turn. The points should be approximately one fix interval apart. Bridge or CIC will have a good fix plotted before the other station shifts charts.
- (d) An extended range scale will be placed on paper charts to facilitate laying of RADAR ranges or distances.
- (e) A speed triangle will be placed on paper charts to facilitate the efficient and accurate application of a DR plot and the computation of drift.

(f) Sound signal and light characteristics of all navigation aids will be determined and their specific characteristics labeled next to each NAVAID the ship will pass if not already labeled on the chart.

(g) Restricted water charts are annotated for shoal water, points of hazards, or dangers; including overhead obstructions, with danger bearings or ranges laid out for hazards which are not identified by a navigation aid.

(h) Indicate position along the track where the PIT SWORD will be raised and lowered, if required.

(i) Charts will be reviewed, signed, and dated, prior to initial use. All subsequent changes will be addressed in the Navigation Brief. At a minimum, the following information will appear on every paper chart displaying a restricted water track:

1. Prepared by.
2. Reviewed by (Senior QM/Senior OS).
3. Reviewed by (ANAV/Piloting Officer) (CNAF).
4. Submitted by (NAV).
5. Reviewed by (XO) (CNSF).
6. Approved by (CO).
7. Date.

(5) Situational Awareness ECDIS-N use.

(a) If an OPNAV-approved ECDIS-N has been installed, an electronic plot must be maintained for SA and navigation team training purposes, even if the ship is not authorized ECDIS-N as primary plot.

(b) Any other product used as a situational awareness tool must be capable of displaying the current edition of the DNC; must be capable of updating the DNC; and must have an input from an approved Precise Positioning System (PPS) GPS receiver (AN/WRN-6, GPS Versa Modula Eurocard (VME) Receiver Card (GVRC), or DAGR only) with crypto loaded. Updates must be accomplished by application of the appropriate Vector Product Format Database Update (VDU); or downloading of the applicable library with the VDU incorporated.

(c) All ECDIS systems utilized for SA only must display the most up to date chart information and route that is used for navigation.

(d) VDUs must be applied prior to any DNC library use, including route planning.

4. Requirements Prior to Entering Restricted Waters.

a. For ECDIS-N Certified Ships:

(1) The Navigator is charged with preparing a navigation brief and a voyage plan or routes for safe and prudent passage, including piloting. The voyage plan or routes will be electronically reviewed and approved by the CO per procedures outlined in the ECDIS-N operator's manual and the ship's Navigation Bill. To allow for review of changes to an approved ECDIS-N navigation, voyage plan or routes, it is mandatory that the Navigator utilize the Voyage Planning/Piloting Preparation Checklist in Appendix C, which lists plan basics for reference. Additional sheets for managing a part of the Navigation Plan (i.e., Voyage, Routes and PIM plans, Chart and Layer Portfolios) are also available. A copy of the Voyage Planning/Piloting Preparation Checklist must be retained on board with the Navigation brief for 12 months.

(2) VMS will always have at least four charts loaded while in restricted waters. At a minimum, a Harbor, Approach, Coastal, and General chart will be loaded and active in restricted waters. For any reason the ship is unable to meet the requirement the CO needs to be notified, Navigation brief needs to state why a chart will be missing, and a proper deck log entry must be annotated.

(3) Emergency Navigation Laptop (ENL). Once delivered, ENL will be ready for use per the following:

(a) Fully charged battery (including memory battery) and A/C power connected.

(b) Stationed in the bridge to support an easy transition in case of total loss of VMS in the bridge.

(c) Verify that ENL is connected to DAGR and automatically receiving valid input. In case of casualty, manual input from DAGR is authorized. Also verify that:

1. DAGR has crypto loaded

2. DAGR has fully charged memory battery and A/C power connected.

(d) Verify Speed Through the Water (STW) and Heading (HDG) input set to MANUAL (Values updated with ship's current ordered speed and course).

(e) Loaded with the current and updated DNCs for the transit.

(f) The voyage plan must be identical to the primary ECDIS-N system and will be electronically reviewed by the chain of command and approved by the CO.

(g) Display and alarm settings will match the primary ECDIS-N settings (per the ship's NAVBILL).

(4) Upon receipt of the ENL, use of Common Geospatial Navigation Toolkit (COGENT) will no longer be required per reference (t). The laptop being utilized for COGENT will be utilized as a readily

available navigation publication resource. All required navigation publications listed in Appendix A will be stored on the laptop. Use of the COGENT on this laptop may still be used as a situational awareness tool during underway periods. Use of the COGENT program will be left to the discretion of the CO. COGENT will not be assessed for usage during ISIC Navigation Assessments or basic phase certifications. Additionally, DAGR Training is no longer required and will not be assessed for completion by group/squadron staff or ATG.

b. For Ships not authorized for unrestricted navigation operations using ECDIS-N:

(1) The Navigator is charged with preparing a navigation brief and a voyage plan for safe and prudent passage, including piloting. The voyage plan on applicable charts will be reviewed and approved by the CO per procedures outlined in paragraph 3 of this chapter.

(2) To allow for the review of changes to an approved navigation/voyage plan, it is mandatory that the Navigator utilize the checklists provided in Appendix C of this instruction. A copy of the Voyage Planning/Piloting Preparation Checklist must be retained on board with the Navigation brief for 12 months.

(3) At least four charts will be prepared for use while in restricted waters. At minimum a Harbor, Approach, Coastal, and General chart will be prepared and ready for use in restricted waters. If for any reason the ship is unable to meet this requirement, the Commanding Officer must be immediately notified, the Navigation brief needs to state precisely why a specific chart will be missing, and a proper deck log entry must be made.

(4) Any NAVSEA-installed electronic navigation systems are to be used for situational awareness during restricted waters transits, but must not be used as primary or secondary plot. Mention of this policy should be included in the navigation brief.

5. Requirements While in Restricted Waters.

a. For ECDIS-N Certified Ships:

(1) Due to its simultaneous display of the ship's position at all ECDIS-N stations, the Navigation Evaluator is not required to provide a Navigation Report (see 5.b.(2) in this section for report requirements), with the exception of MCM-1 class that have only one VMS node in the bridge. Reports may be provided as required by the Navigation Bill. Shipping Reports will be provided as necessary. Safe for Navigation Reports (see 5.b.(6) in this section) are required.

(2) The ship's position, utilizing all sensors, will be plotted, displayed and correlated within the ECDIS-N prior to getting underway and prior to entering restricted waters. Each sensor's difference when compared to the ship's primary position source (e.g., range and bearing from GVRC1 position) must be logged in the Bearing Book and Deck Log prior to the underway or entering restricted waters. VMS 9.3 and 9.4 ships will use the Position Uncertainty function to determine sensor errors.

(3) Visual and RADAR fixes must be plotted at least every third fix interval using the ECDIS-N. It is recommended that both types of LOPs be used frequently enough to maintain familiarity with visual and RADAR plotting procedures. This standard comprises the Primary back-up for the loss of GPS inputs to the ECDIS-N, to include manual DAGR input. LCS class ships are not required to plot visual or

RADAR fixes due to manning and design constraints (refer to 5.a.(5)(e) in this chapter). Zumwalt Class ships are not required to take visual fixes due to design constraints where ships have limited field of view capability on the alidades.

(4) On the ENL, verify DAGR position with primary ECDIS-N position every third fix. STW and HDG data must be inputted manually for every course and speed change.

(5) Experience has shown that the ECDIS-N functions best with a redistribution of Navigation Team assets. The following watch stations are recommended:

(a) The Navigation Evaluator and a bridge/CIC phone talker should be stationed at the primary navigation plot display and maintain contact with the Piloting Officer, Bearing Recorder, and Navigation RADAR Operator. In the event of a NAV-1 failure, the Navigation Evaluator and ECDIS-N phone-talker should be able to rapidly relocate to another node in order to maintain the plot. The ship's Navigation Bill must have this casualty procedure in place for use.

(b) The ECDIS-N Display Operator or Navigation Plotter and the Bearing Recorder should be stationed at the closest ECDIS-N display off the Bridge. This will allow for receiving and plotting visual and RADAR LOPs without tying up the primary navigation plot display, and help minimize noise on the Bridge. In the event their ECDIS-N node fails, the ECDIS-N Display/VMS Operator and Bearing Recorder should be able to rapidly relocate to another node in order to maintain the plot. The ship's Navigation Bill must have this casualty procedure in place for use.

(c) The Navigation RADAR Operator may be stationed on the Bridge, or in CIC, and must have communication with the Bearing Recorder.

(d) If the DFGMC does not provide a direct input to ECDIS-N, the ship must develop procedures to pass Magnetic Heading to the Bearing Recorder if a relative-bearing plot is required. The ship's Navigation Bill must have this casualty procedure in place for use.

(e) LCS deviation LCS-022 outlined in reference (x) is incorporated in this governing policy. LCS uses GPS as primary fix source. Due to ship design and manning constraints, the ship class is not required to plot visual or RADAR fixes. LCS navigates with a fully digital navigation suite that includes three GPS receivers, ECDIS-N, and ARPA. In the event of complete power failure or equipment casualties, back-up systems include additional GPS receivers (three on LCS 1, two on LCS 2) and ENL. Consequently, bearing takers or bearing recorders are not required on the navigation watch team.

(f) For Zumwalt Class, visual fixes are not required due to design constraints where ships have limited field of view capability on the alidades.

b. For Ships not authorized for unrestricted navigation operations using ECDIS-N:

(1) Navigation information maintained in CIC, designated as the Secondary Navigation Plot (SNP), will supplement the Navigator's Primary Navigation Plot (PNP). The CO may authorize a shift in the location of the primary plot to suit a particular situation. This transfer must be announced on the Bridge and in CIC, and an entry must be made in the ship's deck log and CIC watch log. Other navigation plots may be utilized or required aboard a ship (e.g., Secondary Control Station, Zulu Module

or SubPlot, Flag Plot, or a “training plot” in the chartroom or elsewhere) however, the location of the PNP and SNP must be explicitly defined in the ship’s NAVBILL.

(2) The Navigation Evaluator will ensure every fix determined from the Primary Navigation Plot is compared to the fix obtained at the Secondary Navigation Plot. Reporting requirements may change depending on the situation. The ship’s familiarity with the port, the material condition of Situational Awareness tools (e.g., VMS, COMDAC), and the specific desires of the CO and OOD should all be factored into tailoring what and when information is reported. At a minimum, every verbal position report made by the Navigation Evaluator to the Navigator, Conning Officer, and CO—the Navigation Report—will include the following information for each fix:

(a) Fix time.

(b) Fix method (GPS (PPS), visual, RADAR, composite, running fix, etc.). If GPS (PPS) is used as the primary fix source, the Navigation Evaluator will report FOM during the verbal report.

(c) Fix position in relation to proposed track.

(d) Any recommendation to regain or maintain proposed track. It is a good practice to pause the report at this point to allow the CO/OOD/CONN to report their concurrence or disagreement with the recommendation.

(3) Supplemental information should also be included, when appropriate, to enhance navigation safety. Such items include:

(a) Nearest hazard to navigation.

(b) Nearest aid to navigation.

(c) Corrected fathometer sounding, and comparison to charted depth.

(d) Distance and time to next turn (minimally at the beginning of each track leg, updated as necessary, and with each fix report at least 2 fixes prior to the turn).

(e) Next course (reported at least once each leg and updated as changes occur).

(f) Set and drift (once on each leg less than 1500 yards and every third fix on legs greater than 1500 yards).

(4) The phrase "CIC concurs," "CIC does not concur," or "CIC has no fix," as appropriate, will conclude any report. If the Bridge Team is maintaining the Secondary navigation plot, the Navigation Evaluator will report concurrence/non-concurrence after the CIC report. The phrase "GVRC1/2 concurs/GVRC1/2 does not concur with Visual/RADAR fix" will also be reported when applicable.

(5) The Conning Officer must acknowledge the Navigation Evaluator’s report. The OOD must ensure the Conning Officer has acknowledged the Navigation Evaluator’s report and has indicated whether OOD intends to comply with the course and speed recommended by the Navigation Evaluator

and immediately report non-concurrence to the CO. Any non-concurrence will be acknowledged by the Navigation Evaluator and logged in the ship’s Deck Log.

(6) The Navigation Evaluator will acknowledge all course and speed changes made by the Conning Officer. The Navigation Evaluator must provide a report as to whether the new course is safe from hazards to navigation and for what distance it is deemed safe. The Shipping Officer must similarly report whether the new course is safe from shipping hazards. These reports constitute the Safe for Navigation Report. Any report that a new course is not safe must be acknowledged by the Conning Officer and CO verbally, and the reports will be logged in the ship’s deck log.

(7) The Piloting Officer will report to the Navigation Evaluator all navigation fix information derived by RADAR or any other source at each fix. The format for this report should follow the same format as the report given by the Navigation Evaluator.

PRIORITY	Bridge	CIC
Primary	GPS1	GPS2
Secondary	GPS2	GPS1
Tertiary	Visual/Composite/ RADAR/Celestial	RADAR/Composite/ Visual/Celestial
Last Resort (Open-Ocean)	INS1	INS2

Table 4-B Sample Fix Source Priority

NOTE: At any given time the Primary and Secondary plots must utilize a different fix source. For ECDIS-N ships, the availability of a second authorized GPS (PPS) source, even if not selected, is sufficient.

6. Incident Procedures.

a. For Ships authorized for unrestricted navigation operations using ECDIS-N:

(1) After an incident (i.e., grounding, collision, etc.) the CO, or the Investigating Officer, will take custody of VMS electronically formatted data and any logs in use at the time of the incident. Watch bills, evolution briefs, checklists, and any other pertinent documentation will be collected as well. Any logs collected will be copied, and such copies returned to the Navigator as soon as possible to prevent loss of these documents.

(2) To meet expected, separate Safety Investigation Board and Uniform Code of Military Justice requirements for Courts-Martial, the following electronic data collection methods will be utilized as soon as possible after the incident:

(a) The Navigator and either the Investigating Officer or one other Officer not part of the Bridge or Navigation Detail at the time of the incident will observe the Navigation Technician or other knowledgeable person make two copies of the primary plot ECDIS-N system files for the period of time beginning at the start of the voyage plan or transit, before the incident to no more than two hours after the incident (time based upon the Deck Log entry) to two suitably labeled, portable storage mediums, preferably CD-ROMs. Flash drives, or other media are authorized if necessary, but will be coordinated with cognizant Information Security Officer prior to use. Both copies will be placed into a suitable

container, which will be sealed in a tamper-proof manner. All present will then sign and date a custody sheet for witnessing the data collection and container sealing. The CO, or his designated representative, will take custody of the sealed containers and statement sheets, which will be turned over to the incident investigators as required.

(b) The same process will be used to extract similar data from any other electronic system, such as any NAVSSI logs, AN/WSN-7, etc., installed aboard.

b. For Ships not authorized for unrestricted navigation operations using ECDIS-N:

(1) After an incident (i.e., grounding, collision, allision, etc.) the CO, or the Investigating Officer, will take custody of both sets of navigational charts and any logs in use at the time of the incident. If the chart is required for a period of time to safely complete the ship's movement, the chart must be immediately signed on its margin by the CO and XO in a distinct and noticeable manner. This will be logged in the Deck Log, and the chart collected as soon as it is no longer required for navigation. Watch bills, evolution briefs, checklists, and any other pertinent documentation will be collected as well. Any logs collected will be copied, and such copies returned to the Navigator as soon as possible to prevent loss of these documents.

(2) To meet expected, separate Safety Investigation Board and Uniform Code of Military Justice requirements for Courts-Martial, the following electronic data collection methods will be utilized as soon as possible after the incident:

(a) If ECDIS-N is installed: The Navigator and either the Investigating Officer or one other Officer not part of the Bridge or Navigation Detail at the time of the incident will observe the Navigation Technician or other knowledgeable person make two copies of the ECDIS-N system files for the period of time beginning 24 hours before the incident to no more than two hours after the incident (time based upon the Deck Log entry) to two suitably labeled, portable storage mediums, preferably CD-ROM's. Flash drives, or other media are authorized if necessary. Both copies will be placed into a suitable container, which will be sealed in a tamper-proof manner. All present must then sign and date a custody sheet for witnessing the data collection and container sealing. The CO, or designated representative, will take custody of the sealed containers and statement sheets, which will be turned over to the incident investigators as required.

(b) The same process will be used to extract similar data from any other electronic system, such as any NAVSSI logs, AN/WSN-7, etc., installed aboard.

CHAPTER 5
EXPEDITIONARY CRAFT

1. General. This chapter applies to all CNSF expeditionary craft. Due to manning and equipment differences, expeditionary craft cannot be held to the same requirements as surface ships. This chapter must be utilized for all Landing Craft Utility (LCU), Landing Craft Air Cushion (LCAC), and Improved Navy Lighterage System (INLS) craft to improve navigation accuracy. Personnel assigned responsibilities for navigation are required to read and demonstrate knowledge of the contents of this chapter and all references prior to assuming their duties.

2. Duties and Responsibilities. With respect to navigation, the following duties and responsibilities are unique to expeditionary craft and as amplified below:

a. For Landing Craft Utility (LCU).

(1) Commanding Officer (CO). The CO is responsible for the safety of all assigned craft. The CO will conduct navigation assessments on each craft as part of the craft crew's unit level training.

(2) Executive Officer (XO). The XO is responsible for the safe navigation of every craft. The XO will review the mission briefs and charts for completeness.

(3) Command Navigator. The CO will designate the Command Navigator in writing. The Command Navigator will:

(a) Provide training in proper navigation procedures to all assigned craft navigators and craft masters.

(b) Supervise conduct of navigation training and drills during craft pre-deployment training as a member of the Seamanship Training Team.

(c) Maintain a current library of charts, publications, Notice to Mariners, and Hazards to Navigation to support every craft assigned to their command.

(d) Issue charts and publications per CO's Ready Chart List.

(e) Issue charts covering the expected areas of operations to each deploying craft, at least three months prior to deployment.

(f) Provide craft navigators with the information, publications, and technical assistance to correct charts as required.

(g) Review every mission brief, chart, and route plan for completeness.

(4) Craft Master. The Craft Master is responsible for the safe navigation of the craft. The Craft Master will:

(a) Use all available means of fixing the craft's position.

(b) Keep continually informed concerning the tactical situation and geographic factors that may affect the safe navigation of his or her craft, and take appropriate action to avoid danger of grounding or collision.

(c) Issue necessary orders to the Helmsman and Throttle-man to avoid danger, or to change course and speed.

(d) Ensure required charts are onboard prior to getting underway for assigned operations. Arrange through the Command Navigator, three months prior to deployment, for issue of charts covering the expected areas of operations.

(e) Ensure charts and publications identified in the CO's Ready Chart List are maintained onboard the craft and are up to date.

(f) Verify that all navigation and communications equipment are onboard the craft and fully operational prior to getting underway.

(g) Ensure the Craft Navigator is familiar with this instruction and attends navigation training provided by the Command Navigator. While embarked aboard ship, make every effort to arrange navigation training for the Craft Navigator with the ship's Navigation Department.

(h) Ensure the Navigation Detail is stationed as required and all required stations are manned.

(i) Review CO's Ready Charts monthly.

(j) Be present at each Mission Brief for assigned craft.

(5) Craft Navigator. The Craft Navigator must be qualified as outlined in table 5-A. The Craft Navigator is responsible under the Craft Master for the safe navigation of the craft. He/she will receive all orders relating to navigation duties directly from the Craft Master and will make all reports directly to the Craft Master. This chapter does not limit the Craft Navigator in using the best professional judgment in assessing discrepancies and advising the Craft Master. The Craft Navigator will:

(a) Maintain an accurate plot of the craft/s position by all available means. The only authorized Global Positioning System (GPS) inputs to be used for acquiring craft positions are the Defense Advanced GPS Receiver (DAGR) and Furuno GPS (GP37). The CO or the deployment Amphibious Ready Group (ARG) representative must approve the use of any other GPS means. No single source of navigation information will be used in exclusion of others.

(b) Notify the Craft Master immediately when the determination is made that the craft is standing into danger. Ensure the report is acknowledged, and make course and speed recommendations to prevent the craft from entering dangerous waters. Recommendations will be recorded in the Deck Log.

(c) Give careful attention to the course speed, and charted depth of water when approaching land or shoal water.

(d) Maintain records of all observations and computations made for the purpose of navigating the craft. All records must be retained as the craft/s official records and craft history record for six months.

(e) Since the day-to-day operations of craft may require different Craft Masters at the conclusion of each underway period the Craft Navigator will review and present the Deck Logs to the Craft Master who is responsible for the craft that day, for his or her approval and signature. Operational Risk Management and Mission Briefs must be turned over to the Command Navigator and retained for one year per reference (I).

(f) Procure charts and publications as identified in CO's Ready Charts List from the Command Navigator and ensure they are maintained up to date.

(g) Conduct a semi-annual inventory of all charts and publications held onboard per CO's Ready Charts List. Make recommendations to the Staff Navigator on charts and publications that should be added to CO's Ready Charts List.

(h) Ensure corrections are made to charts prior to use for Craft Master Review.

(i) Personally supervise navigation of the craft when in restricted waters and when at Condition I.

(j) Before entering restricted waters, study all available sources of information concerning navigation where the craft is likely to operate.

(k) Prior to anchoring, ensure the appropriate chart depicting the craft's anchorage position and all navigation aids to be used are identified to the Craft Master. Upon anchoring, plot the anchor's position, swing and drag circles. Determine if the anchor is holding and establish fix intervals not to exceed fifteen minutes.

(l) Ensure the proper operation, care and maintenance of navigation equipment. To this end, he/she will:

1. Ensure navigation equipment is maintained and properly adjusted per the Preventive Maintenance System (PMS) and, if appropriate, that calibration curves or tables are maintained and checked at prescribed intervals. Any degradation to navigation equipment will be reported to the Craft Master.

2. Ensure GPS-based time checks are passed throughout the craft before any special evolution and logged in the craft's Deck Log.

(m) Ensure the proper preparation, accurate entries and timely submission of the Deck Log. The Navigator will daily, and more often when necessary, inspect the craft's Deck Log and take corrective actions as may be necessary and within his or her authority.

(n) Prepare and present navigation charts and tracks at mission briefs.

(o) Ensure Special Evolution Checklists are completed as required (i.e., Underway/Entering Port, Low Visibility, etc.) and log the commencement and completion of all checklists in the Craft's Deck Log.

(p) Ensure required navigation training is conducted for all appropriate personnel.

(6) Craft Quartermaster. When assigned, Craft Quartermaster will assist the Craft Navigator in all aspects of navigation, piloting and administration.

b. For Landing Craft Air Cushion (LCAC).

(1) Commanding Officer (CO). The CO is ultimately responsible for the safe navigation of all the craft assigned to the command and will establish a written Navigation Policy and Standard Navigation Procedures as well as designate a collateral duty Command Navigator.

(2) Command Navigator. Responsible for the maintenance of all navigation-related products (SNC or DNC), instructions, procedures, and policies and for reporting to the Commanding Officer the status of all navigation-related equipment and crew certification for their unit(s). The Commanding Officer will designate a Senior Navigator from assigned Detachment Craft Navigators, one for each platform, to act as the Command Navigator for all LCAC deployed away from homeport.

(3) Detachment Officer-In-Charge (OIC). The OIC is overall in charge of detachment operations while on deployment. The OIC is responsible for providing timely planning information to the operational commander as well as all pertinent information about craft capabilities and craft status.

(4) Craft Master. The Craft Master is responsible for safe navigation of the craft. In times of armed conflict, or in exercises simulating war or armed conflict, competent authority may modify use of lights or other safeguards required to prevent collisions at sea. In exercises, such modifications will be employed only when LCAC will not be hazarded.

(5) Craft Engineer. Acts as assistant Craft Master. Maneuvers craft when Craft Master is incapacitated and during required cross seat training as required by LCAC Safe Engineering and Operations (SEAOPS) manuals. When acting as Craft Master the Craft Engineer will assume all navigational responsibilities of the Craft Master. Acts as lookout during normal operations.

(6) Craft Navigator. Responsible for safe navigation of the craft using installed C4N equipment, to include RADAR, paper and digital nautical charts, Amphibious Assault Direction System (AADS) and Automatic Identification System (AIS), to develop a navigation picture and maneuvering plan. Due to differences in installed craft equipment block cycles, installed navigation equipment and capabilities may differ from craft to craft. If installed equipment is degraded or non-operational the Craft Navigator must inform the Craft Master of current craft status and include current equipment status in the Craft Deck Log. Maintain the Craft Deck Log per the command instruction.

c. For Improved Navy Lighterage System (INLS)

(1) Commanding Officer (CO). The CO is responsible for the safe navigation of every craft. The CO must conduct navigation assessments on each Craft Master as part of the Craft Qualification process.

(2) Executive Officer (XO). The XO is responsible for the safe navigation of every craft. XO is responsible for Command Navigation Policy and Guidance.

(3) Bravo Company Commander (B6). The B6 is responsible for the safe navigation of every craft. B6 will oversee the navigational planning/employment of craft including the review of all craft mission briefs and charts for completeness.

(4) Command Navigator. The CO will designate the Command Navigator in writing. The Command Navigator will:

(a) Provide training in proper navigation procedures to all assigned craft navigators.

(b) Supervise conduct of navigation training and drills during craft pre-deployment training as a member of the Lighterage Training Team.

(c) Maintain a current library of charts, publications, Notice to Mariners, and Hazards to Navigation to support every craft assigned.

(d) Procure, update and issue charts and publications per CO's Ready Chart List.

(e) Issue charts covering the expected areas of operations to each deploying crew at least three months prior to deployment.

(f) Provide craft navigators with the information, publications, and technical assistance to correct charts as required.

(g) Review mission briefs, charts, and route plans for completeness.

(5) Craft Master. The Craft Master is responsible for the safe navigation and piloting of the craft at all times. Craft Masters will use all available means appropriate to the circumstances to determine if risk of collision exists. This includes the use of RADAR and radio communications with other vessels.

(a) Follow the inland and international rules of the road at all times per reference (e).

(b) Verify that all navigation and communications equipment are onboard the craft and fully operational prior to getting underway.

(c) Keep continually informed of the tactical situation and geographic factors that may affect the safe navigation of his or her craft, and take appropriate action to avoid grounding or collision.

(d) Be capable of operating INLS craft in manual, joystick/joystick, pilot and transit, and hold heading/hold position mode.

(e) Maintain charts, Local Notice to Mariners, Notice to Mariners, Broadcast Notice to Mariners, NAVAREA IV and XII, HYDROLANT, HYDROPAC, HYDROARC and Coastal Warnings messages applicable to the assigned operating area. Inventory all charts semi-annually and make corrections, if needed, prior to using for navigational brief and underway.

(f) Will be proficient in plotting waypoints and courses on charts.

(g) Will be proficient in the use of INLS NAVNET System. He/she will be familiar in plotting waypoints and courses, operating in overlay, plotter, RADAR, and depth sounder mode.

3. Standard Policies, Requirements, and Procedures.

a. For LCUs.

(1) The navigation plot maintained on the Navigator's chart table in the pilothouse is designated as the primary navigation plot.

(2) A GPS position plotted on Standard Nautical Charts (SNC) is the primary method to fix the craft's position. The only authorized GPS inputs to be used for acquiring craft position are the Defense Advanced GPS Receiver (DAGR) and Furuno GPS (GP37). The CO or the Deployment Amphibious Ready Group (ARG) Representative must approve the use of any other GPS means prior to use. The secondary method will be RADAR ranges. Both GPS and RADAR ranges will be plotted on SNCs.

(3) Predetermined Tactical Data does not exist for the LCU, and since turning diameter changes with the various load configurations, the Craft Master will have to determine when to execute turns in a timely manner to steady on track for the next leg, based on the situation.

(4) Low Visibility procedures and checklist are contained in unit specific instructions.

(5) Accurate and projected position information must be updated sufficiently often to provide timely warning if the craft is standing into danger. To this end the Craft Navigator will:

(a) Ensure the craft's position is fixed at an interval that assures safe navigation per Chapter 3 of this instruction and extend the dead reckoning (DR) at least two fix intervals at each fix.

(b) Shoal water is any charted depth of 6 feet (1 fathom) or fewer.

(c) In addition to maintaining accurate records, and logs per reference (u) the following deck entries will be made:

1. Commencement and completion of all special evolution checklists
2. Starting/securing of generators and main engines.
3. Communications checks and status.
4. Completion of steering checks.
5. Completion of throttles checks.
6. Beaching and retracting times.
7. Crossing the sill.
8. Crossing the LOD.
9. Load information.
10. Sailing list.
11. Shore power/craft power shift.
12. Hotel Service hook up/disconnect.
13. Commencement and completion of inspections.
14. CRRC operations information.
15. On station for an operation, exercise, or tasking.
16. Underway to location, OP area, mission, etc.
17. Incapacitation of Craft Master.
18. Restricted Maneuvering set.

(6) Checklists are provided in unit specific instructions. Commencement and completion of the checklists will be logged and the completed checklists will be retained onboard for six months.

(7) Make navigation reports to the Craft Master after each fix per unit specific instructions. The Craft Master must acknowledge reports, and provide feedback as to concurrence or disagreement. The Craft Master should advise the Craft Navigator if the situation warrants deviation from navigation recommendations (i.e. maneuvering for collision avoidance).

(8) Set and drift will be computed or recorded and logged in the Deck Log every three hours while underway. A recommended course to compensate for set and drift will be determined by the Craft Navigator or the QMOW.

b. For LCACs.

(1) LCAC can operate under advisory, independent, and positive control of a ship or station. Regardless of the type of control the LCAC is under, the Craft Master and Navigator retain responsibility for safe craft navigation. If a discrepancy exists between the control station and craft, the Navigator will inform the controlling unit of this condition. If the craft alters course for the purpose of collision avoidance, the Navigator will inform the control ship of this alteration.

(2) All LCAC crewmembers will at all times maintain a proper lookout by sight and all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and the risk of collision. Crewmembers must not depend on one source of information at the detriment of others to establish craft position, however if even one source indicates that the LCAC is maneuvering into danger any crew member must recommend "all stop" or "emergency stop", as the situation warrants, until craft position can be verified or the danger has passed.

(3) Mission planning guidelines listed in SEAOPS will be utilized to build a mission profile prior to craft launch. All available resources, to include, but not limited to, message traffic, charts (paper and/or digital) or chartlets, mission planning worksheets, and track data sheets, must be used to build the mission profile. The mission profile will be used to develop the required brief as well as inform all LCAC crewmembers of required operational details to include operational risk assessment and mitigation. Craft Navigators must use all mission-planning materials to input mission details into C4N systems, as applicable to installed equipment capabilities, to navigate the LCAC along a predetermined track. If any deviations from the briefed track are required due to changes in operation details, contact avoidance, or weather, every attempt will be made by craft crew to re-establish the track as soon as practical. If the briefed track cannot be maintained Craft Navigators will inform the controlling station or host command as soon as operational conditions permit.

(4) When installed, Amphibious Assault Direction System (AADS) and Automatic Identification System (AIS) will be utilized at the discretion of the Operational Commander. Status of AADS and AIS must be recorded in the Craft Deck Log at the commencement of the mission, or as equipment status changes.

c. For INLS.

(1) In general, the INLS NAVNET System will be set to overlay mode displaying both RADAR and navigational information in the same display, set to track up, for harbor piloting. Other modes may be used for open ocean transit at the Craft Master's discretion, as long as both RADAR and navigational information are both displayed.

(2) Ensure lookouts are stationed fore and aft of the craft while underway with binoculars and radios. All reports will be made via radio directly to the Craft Master, with the Deck Supervisors monitoring reports for situational awareness. At a minimum, the lookouts will report estimated range, estimated bearing, and bearing drift.

(3) Make deck log entries for all navigational information to include but not limited to: passing waypoints, anchoring, towing and or any other significant events.

4. Organization of the Navigation Team.

a. For LCUs.

(1) During open ocean and coastal transits a Craft Navigator will be responsible for all navigation and log keeping duties. However, to prevent overloading a single watch stander during piloting and restricted waters transits, and to ensure the required fix interval, speed, and accuracy are maintained, a full Navigation Detail will be manned as follows:

(a) Navigator. The Navigator will plot label each fix on the chart in use. The Navigator will extend the Dead Reckoning (DR) at least two fix intervals, compute set and drift and evaluate craft's projected movements. The Navigator will compute such items as distance right or left of proposed track, time and distance to the next course change, and any other tasks directed by the Navigator or Navigation Evaluator. The Navigation Plotter will plot and compare GPS, RADAR or composite positions as necessary not to exceed every third fix interval, even using GPS as the primary fix source.

(b) Assistant Navigator (ANAV)/Quartermaster of the Watch (QMOW). When assigned to maintain the craft deck log per reference (u), and this instruction. The ANAV/QMOW may also assist the Navigation Team by marking the time for the fix interval, gathering and recording navigation data, and providing data to the Navigation Plotter.

b. For LCACs. Per Table 5-B.

c. For INLS. Per Table 5-B.

5. Navigation Mission Planning.

a. Craft Masters must prepare and present a mission-brief to the CO prior to getting underway operations and, when underway, prior to entering restricted waters. The navigation brief will include, at a minimum, the following items:

(1) Mission, Concept of Operations, and Scheme of Maneuver.

(2) Craft status.

(3) Navigation Course Review.

(4) Weather, tides, currents, and astronomical data, and harbor movements

(5) Go/No-Go criteria.

(6) Sail list/Watch bill, including crew endurance factors such as sleep and maximum crew day.

(7) Communications plan.

(8) Safety, ORM and emergency actions.

b. Attendees for the navigation brief will include at a minimum:

- (1) CO
- (2) XO
- (3) Command Navigator
- (4) B6 (INLS Only)
- (5) Controlling stations (OIC, OCO, LSC).
- (6) Underway participants.

c. A muster sheet must be signed by all attendees. Additionally, the brief will be signed by the CO, XO, Command Navigator, and B6 (INLS only).

d. Following the formal navigation brief, the Craft Master will conduct a navigation, operations, and ORM brief with craft crew and riders immediately prior to getting underway. This brief is to refresh the craft crew and account for any changes since the formal navigation brief.

6. Navigation Contingency Plan. In addition to the requirements above to ensure an accurate fix, compare navigation data from all available sources whenever possible.

a. If comparisons indicate excessive differences, determine the source of excessive differences from resultant best fixes and analyze them to determine the cause.

(1) Only the Craft Navigator or the Craft Master may reset electronic navigation equipment. Reset will be per equipment operator's manuals and instruction placards, and logged in the deck log.

(2) In the event RADAR navigation is required, all fix data must be obtained from fixed aids to navigation and charted structures whenever possible. When buoy positions are verified, bearings to buoys may be used to help clarify the navigation picture when no other objects are available.

7. Transition to Electronic Charting. Over the next several years, expeditionary support craft (LCAC, LCU, and INLS) will be transitioning to electronic navigation using Electronic Charting Systems (ECS). ECS acquired for non-commissioned vessels, combatant watercraft, and expeditionary forces are not required to meet the Navy ECDIS performance requirements, but must be able to process and display approved electronic charts produced by NGA. Watercraft 34 feet in length and greater utilizing ECS for primary means of navigation must employ both a primary and an independent secondary ECS to ensure safe navigation without the need to carry SNCs. Certification for the usage of ECS as primary plot will be conducted using navigation assessments as listed below.

8. Expeditionary Craft Navigation Assessments. Expeditionary support craft execute a navigation assessment for each craft. LCAC NAV assessment requirement are contained within SEAOPS and will be performed by the CO, while LCU and INLS Assessments are conducted by the CO per unit specific instruction.

Requirement	Craft Master			Navigator		Engineer		
	LCAC	LCU	INLS	LCAC	LCU	LCAC	LCU	INLS
BUPERS Assigned	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Qualified Enlisted Surface Warfare (ESWS)	No	Yes	No	No	No	No	No	No
Paygrade E6 – E9	No ¹	Yes	Yes	No	No	No	No	No
LCU NEC 0171	No	Yes	No	No	No	No	No	No
LCAC NEC 0304	Yes	No	No	Yes	Yes	No	No	Yes
LCAC NEC 0167	Yes	No	No	No	No	No	No	No
LCAC NEC 4131	No	No	No	No	No	Yes	No	No
Navigation Fundamentals (A-061-0200)	No	No	No	Note 2	Note 2	No	No	No
Quartermaster Journeyman Course (A-061-0300) NEC W13A	No	No	No	Note 2	Note 2	No	No	No

Table 5-A Required Qualifications for Expeditionary Craft

NOTES:

1. LCAC Craft Master must be E7 – E9.
2. By FY21, all LCAC and LCU Navigators be graduates of either QM Journeyman Course or Navigation Fundamentals Course. QM Navigators will attend the QM Journeyman Course, while other ratings will attend the NAV Fundamental Course.

	Restricted Waters			Piloting Waters			Open Ocean/ Coastal Waters		
Distance from land or shoal water	<2 NM			2-10 NM			>10 NM		
Craft Type	LCU	LCAC	INLS	LCU	LCAC	INLS	LCU	LCAC	INLS
Watch Stations									
Craft Master	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Craft Engineer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Craft Navigator	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
QMOW	Yes	No	No	Yes	No	No	Yes	No	No
Conning Petty Officer	No	No	No	Yes ¹	No	No	Yes ¹	No	No

Table 5-B Required Watch Stations for Expeditionary Craft

NOTE: Conning Petty Officer must be qualified per NAVEDTRA 43114-D and designated by the Craft Master to be in control of maneuvering the craft for a specified period of time. This is intended to extend the underway endurance of the craft by allowing the Craft Master the opportunity for crew rest during open ocean transits.

CHAPTER 6
RECORDS, LOGS, AND FORMS

1. Purpose. The importance of keeping complete, concise, and accurate navigation records, logs, and forms cannot be overemphasized. Besides providing the recorded history of the ship, they become a basis for analysis, evaluation, and correction of material, operational, and personnel deficiencies. Should it ever become necessary, they comprise the legal records examined by courts of inquiry and official investigations. Experience has shown that poor log keeping is one of the first operational safety risk indicators, showing the beginning of a drift from Navy standards.
2. Corrections. Erasures are strictly forbidden in all navigation logs and records except the Navigation Workbook. Neatly line out and initial an entry to make corrections. Ballpoint pen with non-water soluble black ink will be used throughout, except in the Navigation Workbook in which pencil is authorized for recording and computations.
3. Exception. LCS deviation LCS-012 outlined in reference (x) is incorporated in this governing policy. In LCS class ships, Deck and Position Logs data are recorded by automated systems (VDR and VMS); therefore, these data are not required to be duplicated in manual logs. Nevertheless, all Navy ships are required to have the ability to copy or pull logs for submission to Navy Annex for historical records. In the event that automated systems become non-functional, manual logs will be required to be maintained. So LCS Class ships must ensure that appropriate log forms are readily available onboard.
4. Ship's Deck Log.
 - a. Purpose. The Deck Log will be maintained as a complete daily record. Each watch will ensure their portion of the log is accurately documented. Events that must be documented include each occurrence of an important event which concerns the crew, the operation or the safety of the ship or may be of historical value. When underway, the oncoming OOD and QMOW will review the Deck Log from the previous watch before relieving (Not applicable to Voyage Data Recorder (VDR)). A Navy approved program of record system that records voice and data reports along with time stamps (i.e., VDR) fulfills this requirement.
 - b. Instructions for Maintenance. The Deck Log will be maintained per reference (u). A copy of reference (u) will be kept with the Deck Log at all times. The following entries, in addition to those required by reference (u) will be included as appropriate:
 - (1) Draft (forward, aft, mean) and displacement as computed and reported in the ship's daily draft report.
 - (2) Set and drift (when determined).
 - (3) Time checks.
 - (4) Commencement of and the completion of all special evolutions and of any checklists.
 - (5) All recommendations made by the Navigator, QMOW, or CIC concerning the maneuvering of the ship.
 - (6) If the CO removes the requirement to maintain the Magnetic Compass Record (NAVSEA 3120/3), all true and magnetic headings will be logged in the ship's Deck Log (OPNAV 3100/99), to include gyrocompass/INS error, daily navigational and conning gyrocompass repeater error, and magnetic

checking courses. Recording the results of the DFGMC in the ship's Deck Log ensures a record of accuracy and reliability.

(7) The passing of all channel markers during a restricted water transit.

(8) Crossing the line of demarcation inbound/outbound.

c. Responsibility for Review and Approval. The Navigator will review the Deck Log daily for accuracy, completeness, and formality of entries and submit the record to the CO at the end of the month for signature.

d. Retention. Deck logs should be submitted as either paper deck logs or fillable, digitally signed PDF file (up to SECRET) by mailing the original paper logs or electronic files on a CD/DVD to the Naval History and Heritage Command (NHHC) no later than the tenth (10th) day of each month. Duplicate paper or electronic copies will be kept onboard for one year.

e. Exception. Refer to paragraph 3 of this chapter for LCS class ships.

5. Ship's Position Log.

a. Purpose. A Ship's Position Log (OPNAV Form 3100/3) will be a record of positions and soundings from all sources used. In addition, GPS FOM and fathometer soundings will be recorded. In light of different ship configurations and missions, specific codes to indicate type of fixes and fix accuracy will be determined by the Navigator, written into the Navigation Bill, and included in the Ship's Position Log and CIC Watch Log. When used by VMS 9.3 or 9.4 ships, EDR and EP positions will also be logged.

b. Instructions for Maintenance. Whenever a fix is determined and at least every half-hour, a position from the primary approved source (GPS (PPS)) will be recorded. The 'Fix Source' column will be labeled per the ship's Navigation Bill. The 'Accuracy' column will contain the FOM.

(1) At a minimum, all military GPS (PPS) sources and AIS will be logged at least hourly. By recording these fix sources in the log and comparing them, confidence can be gained regarding the accuracy of the primary source. Additionally, any deficiencies in the primary or back-up source position will become immediately apparent. Immediately report and log the discrepancies.

(2) The Ship's Position Log may be secured with the concurrence of the Navigator or Assistant Navigator whenever the Standard Bearing Book is used in piloting waters. When entering restricted waters from the open sea, the initial piloting fix will be recorded in both the Ship's Position Log and Standard Bearing Book. The same is true of the last piloting fix when leaving restricted waters. Upon relief or when secured, the watch or Bearing Recorder will sign his or her name across columns 18-41.

c. Responsibility. The Ship's Position Log will be kept during coastal and open ocean navigation.

d. Retention. Keep onboard 12 months from the last entry as part of the ship's official records.

e. Exception. Refer to paragraph 3 of this chapter for LCS class ships.

6. CIC Watch Log.

a. Purpose. The CIC watch log should be a complete and accurate chronological account of both routine and unusual events pertaining to a CIC watch. Normally, the CIC watch supervisor keeps this log, but in some instances, it may be assigned to junior watch standers. Log entries may be either printed or written, but must be legible. Most CIC logs are maintained on a General Log, OPNAV Form 3100/2. These log forms are loose-leaf, and each page must be serially numbered when the log is opened for use. In addition to its use as a CIC log, the General Log may be used to record information when no other operational data form applies.

b. Instructions for Maintenance. CIC watch log entries are similar to ship's deck log entries and should be made in black ballpoint pen ink. Once a log entry, do not erase it. If there is a need to correct an entry and are authorized to make the correction, draw a single line through the original entry so that it remains legible. Then insert the correct entry so that it is clear and legible and initial the correction in the margin of the page. For all logs, additions or changes to log entries must be made personally by the individual who signs the log for the watch.

c. Responsibility. The CICO is responsible for reviewing the accuracy and maintenance of the CIC watch log.

d. Retention. Keep onboard for 2 years from the last entry as part of the ship's official records.

7. Radar Navigation Log.

a. Purpose. A radar navigation log, sometimes called a navigational fix log, is necessary for all operations requiring CIC assistance in navigation. This log is used whenever radar navigation is conducted, such as when the ship is entering port, leaving port, passing through narrow channels, conducting naval gunfire support, and performing boat control. Entries in the radar navigation log include:

(1) Identification of landmarks used (including latitude and longitude of each point, if necessary)

(2) Bearings, ranges, CPAs to landmarks, and times of observations

(3) Set and drift

(4) Course and speed change recommendations sent to CONN. The time of each entry must be recorded.

b. Instruction for Maintenance. The radar navigation log is usually kept in a standard ledger-type notebook. Ensure all entries are legible and reviewed for accuracy.

c. Responsibility. The CICO is responsible for reviewing the accuracy and maintenance of the radar navigation log.

d. Retention. Keep onboard for 12 months from the last entry as part of the ship's official records.

e. Exception. Refer to paragraph 3 of this chapter for LCS class ships.

8. Surface Radar Contact Log.

a. Purpose. The Surface Radar Contact Log, OPNAV Form 3100/5, is used for recording radar contacts. When a contact is detected, log its range, bearing, and time of detection. Enter the contact's

course, speed, and CPA when they are determined. Enter the time when the contact is put on watch or scrubbed. At the time a contact fades from the scope, enter its range and bearing.

b. Instructions for Maintenance. Instructions for filling out the log are on the reverse side of each sheet.

c. Responsibility. The CICO is responsible for reviewing the accuracy and maintenance of the surface radar contact log.

d. Retention. Keep onboard for 12 months from the last entry as part of the ship's official records.

9. Navigation Workbook.

a. Purpose. The Navigation Workbook (OPNAV Form 3530/1) is the record of all observations and computations used for navigation of the ship.

b. Instructions for Maintenance. The Navigation Workbook will be kept according to OPNAVINST 3530.3. The Navigator is responsible for the proper maintenance of this log. In view of the large amount of data that may be recorded, ships may organize data into separate notebooks as directed by the CO in the Navigation Bill. Locally prepared strip forms will be affixed to or recorded in the workbook. If calculators are used, enough data must be recorded in the workbook to reconstruct the computation. When using computer software (i.e., STELLA, Admiralty TotalTide, NOAA Web site), documentation of work must be maintained in a loose-leaf binder.

c. Responsibility for Review and Approval. The Navigator will review and sign the workbook weekly when in use.

d. Retention. Keep onboard 12 months from the last entry as part of the ship's official records.

10. Standard Bearing Book.

a. Purpose. The Standard Bearing Book (OPNAV Form 3530/2) is a record of the data obtained to determine the ship's position by visual bearings, sextant angles, RADAR bearings, and/or RADAR ranges. Locally-produced forms meeting all requirements are authorized, but their use and retention must meet these standards and be defined in the Navigation Bill.

b. Instructions for Maintenance. The Standard Bearing Book will be kept according to OPNAVINST 3530.3. U.S. Navy Regulations require that ships of the Navy maintain a bearing book. This publication has been printed to meet a recognized need for a standard bearing book. In addition to providing a standard record, the format is intended to provide optimum utility, economy, and flexibility, if information is recorded according to the following recommended rules:

(1) At the head of column (1) the appropriate date should be entered on a separate line; and, thereafter, within the column for any changes of date.

(2) Under the date, times are entered in column (1) for bearings recorded in either of the columns (2) through (6).

(3) In columns (2) through (6), the structure (i.e., lighthouse, tower, tank, etc.) should be clearly identified at the head of each column; and, thereafter, within the column when observation changes to a

new structure. Bearings are recorded in the appropriate columns corresponding to the recorded time. All bearings are true bearings (corrected gyro bearing), unless otherwise indicated.

(4) Depths recorded in column (7) are depths under the keel by echo sounder, unless otherwise indicated. Soundings will be recorded at the time each fix is obtained and labeled feet (FT), meters (m), or fathoms (FM).

(5) RADAR ranges and bearings, corresponding to a time indicated in column (1), may be recorded in either of the columns (2) through (6) by suitable notation.

(6) If magnetic bearings are used the notation should identify such bearings and should include the compass error of the magnetic compass in use, for the particular heading at the time of observation.

(7) Each page should be used until filled. Erasures are not permitted; draw a line through any mistake and rewrite the correct bearing so that both entries are still legible.

(8) Record the paper or DNC chart number in use at the top of the initial page each day. Each shift of charts will be noted in the first available blank line of the log.

(9) The time zone and date will be indicated.

(10) Label RADAR ranges yards (YD) or Nautical Miles (NM). Label stadimeter ranges "STAD."

(11) All bearings are true, unless otherwise indicated by relative (R) or magnetic (M) for helmsman's heading. During loss of gyrocompass and when shifting to relative, the shift will be noted on the first available blank line of the log. An additional column will be utilized to log "Ship's Magnetic Head."

(12) All abbreviations must be according to Chart No. 1, "Nautical Chart Symbols and Abbreviations."

(13) Record the current gyrocompass error and gyrocompass/INS repeater errors for any pelorus being used for navigation fixes or ship control at the top of the initial page at the beginning of a detail or each day if at anchor. Any revised gyrocompass error will be noted in the first available blank line of the log. Enter the RADAR range, bearing error, and heading error of each navigation RADAR in use at the top of the initial page at the beginning of a detail or each day if at anchor.

(14) A list of NAVAIDs ("Gazetteer") must be permanently maintained in both the Bridge Bearing Book and CIC RADAR Navigation Log and will include the abbreviation, noun name, and latitude and longitude. Visual and RADAR NAVAIDs such as tank or tower will have an alphanumeric designation. Other named NAVAIDs, such as Point Loma Light or Chesapeake Light, need not be alpha-numerically designated.

(15) GPS positions will be logged at every fix, or may be logged in the Ship's Position Log if all columns are being used. FOM for each GPS position will be logged in column (7).

c. Responsibility. At the end of the watch or Navigation Detail, the Bearing Recorder will sign the Standard Bearing Book after the last entry on the next available line.

d. Retention. Keep onboard 12 months from the last entry as part of the ship's official records.

e. Exception. For LCS class ships, refer to paragraph 3 in this chapter and Chapter 4 paragraph 5.a.(5)(e) for specific guidance. LCS does not use visual or RADAR fixes, therefore Standard Bearing Book is not applicable to the ship class.

11. Chart and Publication Corrections.

a. Purpose. These files serve as a record of all corrections required for the current allowance of NGA charts, DNCs and publications established by the current edition of the Nautical Chart and Publication Allowance. The electronic Catalog of Maps, Charts and Related Products produced and distributed by Defense Logistics Information Service will be used to verify the availability of any chart or DNC.

b. Instructions. As a result of the inclusion of applicable corrections being published in the Notice to Mariners and available through the NGA Web site, Chart/Publication Correction Cards (NGA Form 8660/9) are no longer required to be maintained. Any corrected paper chart or publication must have a complete and accurate 'Correction Tree' as specified in Chapter 3, which should be validated against the corrections list printed in the NtMs or from the NGA Web site prior to use.

(1) Charts and publications, both paper and electronic, designated by the CO (CO's Ready List) will be kept current at all times.

(2) The current and previous edition of electronic corrections to DNCs (VDU) must be kept onboard. These corrections should be validated against the corrections list printed in the NtMs or from the NGA WEB SITE prior to use.

c. Responsibility for review and approval. The Senior QM/OS is responsible for reviewing the ship's charts, publications, and correction files to ensure their proper maintenance. During audits, the Senior QM or OS will ensure applicable allowance lists, DLA R05 lists/AMPS updates, as well as lists of effective corrections are reviewed during the inventory. Approval will be conducted per Chapter 4 of this instruction.

12. Notice to Mariners and Summary of Corrections.

a. Purpose. U.S. Notice to Mariners, NGA Summary of Corrections, and USCG LNMs will be used to enter critical updates and corrective information on appropriate charts or publications.

b. Instructions for Maintenance. The Chart and Publications Custodians, under the cognizance of the Assistant Navigator and CIC Watch Officer, will keep separate files as follows:

(1) Electronic Notice to Mariners. Notice to Mariners is now exclusively distributed in an electronic (.pdf) format. A server-based file of Notice to Mariners will be kept by the Navigation work center with a separate local file as a back-up. These electronic files must be retained on board for the date of the last correction applicable in the Summary of Corrections.

(a) NGA corrections are available on their web site, see Appendix E for additional instructions.

(b) If using NOAA-produced charts, validate corrections using their web site:
<http://ocsddata.ncd.noaa.gov/ntm>

(2) Electronic Local Notice to Mariners. Local Notice to Mariners are now exclusively distributed in an electronic (.pdf) format available on the USCG Navigation Center Web site

(<http://www.navcen.uscg.gov/?pageName=InmMain>). To be handled the same as Notice to Mariners File and will be held on board for at least one year or longer, as required.

(3) Summary of Corrections. A series of publications that incorporates a historic record of corrections dating from the most recent edition date for NGA products, back to July 1975. The most current version for all editions is on the Digital Nautical Publications - Quarterly Update CD produced by NGA.

(4) Classified Notice to Mariners. Provides the same information as the Notice to Mariners and Summary of Corrections except that the information is for classified charts and publications.

c. Responsibility. The Chart and Publications Custodian will maintain the Notice to Mariners File.

d. Retention. Notice to Mariners records will be kept until issued in a summary document.

13. Navigation Warning Messages.

a. Purpose. Maritime Safety Information (MSI) navigational warnings are part of the Global Maritime Distress and Safety System (GMDSS) internationally and nationally coordinated network of broadcasts promulgated via the World-Wide Navigational Warning Service (WWNWS) to provide vital information for safety of navigation and life at sea. MSI Navigational Warning messages may include but are not limited to:

(1) Maritime, air, or submarine distress and search and rescue (SAR) include Regional and Joint Rescue Coordination Center Search and Rescue SAR messages;

(2) Casualties to major aids to navigation (NAVAID) (i.e., lights, buoys, fog signals, radio beacons, RADAR beacons and electronic aids);

(3) Establishment of new NAVAIDs;

(4) Alterations to existing NAVAIDs;

(5) Hazards to navigation (i.e., dangerous wrecks, floating dangers, objects or structures, ordnance or mines);

(6) Hazardous operations (i.e., gunnery fires and missile or rocket launches);

(7) Sea ice reports;

(8) Changes to port installations and facilities; and

(9) Survey, oceanographic, and other underwater operations.

b. Additional Information. MSI Navigational Warnings are broadcasted as NAVAREAs, to include HYDROLANT, HYDROPAC, and, HYDROARC, and Coastal warnings (NAVTEX), and are aligned to geographic sea areas of responsibility. A NAVAREA is a geographic sea area established for the purpose of broadcast of navigation warnings outside of the Coastal warning area. Coastal warnings typically fall within 200 NMs of a coastline.

(1) Navigational warnings broadcast in English by two means – the International Maritime Satellite System (INMARSAT-C) SafetyNET Enhanced Group Call system or through a NAVTEX service area. NAVTEX is the automatic reception of navigational warnings on the international standard Medium Frequency (MF) 518 kHz of by means of narrow-band direct printing telegraphy to a NAVTEX receiver. Typical NAVTEX range is ≤ 200 NMs.

(2) The term NAVAREA followed by a roman numeral is used to identify a particular sea area. There are 21 geographic sea areas and NGA serves as the WWNWS international coordinator for NAVAREAs IV and XII. A NAVAREA warning is a navigational warning or in-force bulletin promulgated as part of a numbered series by the designated NAVAREA coordinator. NAVAREA warnings broadcast over the Inmarsat. Current U.S. Navy policy prohibits the installation and use of Inmarsat transceivers on naval vessels. To overcome this, NGA disseminates NAVAREA warnings through the Navy's C2OIX system for NAVAREAs IV and XII; and receives, reformats, and disseminates to C2OIX the other 19 NAVAREAs as a HYDROLANT, HYDROPAC, or HYDROARC message dependent on location. U.S. Navy vessels should ensure they are assigned to the respective area AIG to receive the coordinating NAVAREA IV and XII and HYDROLANT, HYDROPAC, and HYDROARC navigational warning messages. AIG 4501 covers NAVAREA IV and HYDROLANT while AIG 4557 aligns to NAVAREA XII and HYDROPAC. Lastly, NGA will sunset the Daily Memorandum for navigational warnings and replace it with an "In-Force" (i.e., all active messages) notification provided through an email subscription service. The notification will be promulgated by the NGA Maritime Watch at 1200 EST daily. Access to the service is located under "Subscribe to BW" on NGA's Maritime Safety Information webpage <http://msi.nga.mil/NGAPortal/MSI.portal>.

(3) The USCG is the national coordinating authority charged with collating and issuing Coastal warnings (NAVTEX). USCG Coastal warning coverage includes the U.S. East, Gulf and West Coasts; Puerto Rico; Southwest Alaska; Hawaii; and Guam. The USCG transmits Coastal warnings NAVTEX as well as through the U.S. Navy's C2OIX system. U.S. Navy ships should ensure they are assigned to the associated AIG to receive USCG Coastal warnings within U.S. waters.

(4) It should be understood Coastal warnings transmitted by the USCG are only covered within U.S. waters. Other national coordinator NAVTEX service areas (e.g., South China Sea, Baltic Sea) may or may not be retransmitted by the corresponding international geographic NAVAREA coordinator. This especially holds true for confined bodies of water where the national coordinator for Coastal warnings is not the same as the NAVAREA international coordinator. An example of this is the Persian Gulf where many Gulf nations may be national coordinators for Coastal warnings but the international NAVAREA coordinator is Pakistan. Further information is located in NGA Publication 117 Radio Navigation Aids <http://msi.nga.mil/NGAPortal/MSI.portal>.

(5) Although NGA does not promulgate Coastal warnings covered by U.S. waters, it does retransmit USCG Coastal warnings that fall out of NAVTEX coverage as a NAVAREA IV or XII; and any USCG Rescue Coordination Center SAR distress message, as well as other Regional and Joint Coordination Centers as a HYDROLANT or HYDROPAC.

(6) As of 29 December 2016, the U.S. Department of State's "Special Warnings to Mariners," the Department of Transportation's "MARAD Advisories," and the Department of Homeland Security's global "Marine Safety Information Bulletin" have been combined to form a single U.S. Maritime Advisory System. The new system consists of two distinct notifications: a U.S. Maritime Alert and a U.S. Maritime Advisory. An U.S. Maritime Alert provides basic information on maritime threats (e.g. threats by foreign military forces, insurgents, terrorists, or criminal agents; temporary closures of internationally recognized sea lanes; or a declaration of hostilities affecting U.S. flagged vessels) to the U.S. maritime industry and is limited to information on who, what, when, and where of a maritime

security incident. An alert is silent on policy statements and devoid of recommendations for specific courses of actions. A Maritime Alert may be followed by a U.S. Maritime Advisory that elaborates on specific threat information as it becomes available and provides U.S. guidance on specific recommended courses of actions. Maritime Alerts and Advisories are issued infrequently (i.e., as a situation emerges). Information regarding current U.S. Maritime Alerts and Advisories is located at MARAD's MSCI portal <https://www.marad.dot.gov/environment-and-safety/office-of-security/msci/>.

c. Instructions for Maintenance and Review. Retain an electronic file copy of all in-force Maritime Safety Information (MSI) Warning Messages. Provide copies to each work center keeping charts.

(1) At sea, the Navigator, Assistant Navigator or Senior Quartermaster, will review the latest MSI to determine pertinent information that should be immediately brought to the attention of the OOD and Navigation Team.

(2) The Navigator will brief the CO on pertinent information from Maritime Safety Information Warning Messages during navigation briefs and at any other time deemed relevant.

d. Retention. Navigational Warning Messages will be kept until they are canceled or superseded by their inclusion in the Notice to Mariners.

14. Magnetic Compass Record.

a. Purpose. The Magnetic Compass Record (NAVSEA 3120/3) is a complete record of all magnetic compass readings and comparative true headings. It is also a record of gyrocompass errors. At the CO's discretion, ships with the DFGMC installed are exempt from maintaining the Magnetic Compass Record. However, ships with DFGMC problems may need or be asked to maintain the Magnetic Compass Record to provide data to troubleshoot the issue.

b. Instructions for maintenance. While the ship is underway, compute gyrocompass error and navigational/conning gyrocompass repeater errors daily and record in the remark column of each page. Enter LAT/LONG of current position when practicable.

(1) A separate log for the computation of repeater error may be used, but this log does not obviate the requirement to record computed gyrocompass errors in the Magnetic Compass Record or Deck Log.

(2) Compass comparisons between the magnetic compass and the helm repeater in use for steering will be made and recorded every half hour and every time a new ordered course is steered, when practicable. If the Magnetic Compass Log is not used, the ordered course/checking course entries satisfy this requirement.

(3) Make compass checks and log errors any time a gyrocompass alarm is received.

(4) If the steering repeater and the heading source do not correspond within 1.0 degree at the time of obtaining a compass check, immediately repeat the check for possible error in reading. If there is in fact an error, immediately inform the OOD, Navigator, ANAV, and leading Interior Communications (IC) technician. Additionally, if the INS and gyrocompass repeater do not agree within 1.0 degree, inform the OOD and Navigator immediately.

(5) For Standard Magnetic Compasses, prepare a table of deviations, making sure that copies are posted at the appropriate conning and plotting stations and included in the Magnetic Compass Log, inside front cover. Ships using digital flux gate magnetic compasses are not required to post deviation tables but

are required to ensure that digital electronic compasses and all remote repeaters are operating within limits contained in the appropriate technical manuals.

c. Responsibility for review and approval. If being maintained, the Navigator will review and sign the Magnetic Compass Record weekly and submit the record to the CO on the last day of each quarter for signature.

d. Retention. Keep onboard 12 months from the last entry as part of the ship's official records.

15. Captain's Night Order Book.

a. Purpose. Captain's Night Order Book contains the orders of the CO for the operation and safe navigation of a ship underway during the night.

b. Instructions for Maintenance. The Captain's Night Order Book is kept in bound ledger or loose-leaf form. The orders for each night are written on a separate sheet and signed by the CO. They include such items as courses and speeds, expected sightings, engineering data, the tactical situation and composition of the formation, and supplementary orders to the OOD. This book forms a permanent part of the ship's records and will be kept in a binder with the CO's Standing Orders and other required reading sheets (to be reviewed monthly). Ships may generate a blank form tailored to their individual characteristics (e.g., With ship's engineering plant, weapons systems pre-printed, etc.).

c. Responsibility. The Navigator is responsible for preparing and submitting the Captain's Night Order Book to the CO for approval.

d. Retention. Keep onboard 12 months from the last entry.

16. Navigation Brief.

a. Purpose. To provide a plan for safe and prudent passage, including piloting in restricted waters.

b. Instructions for Maintenance. The Navigator is charged with supervising the preparation of each Navigation Brief per Appendix B. Appendix B requirements are the minimum requirements and each command should expand upon these requirements as necessary. The Navigator, XO and CO will sign the file copy.

c. Retention. Keep onboard 12 months from the last brief.

17. Surface Weather Observation Form.

a. Purpose. To provide inputs to the weather observation (SYNOPTIC) message.

b. Instructions for Maintenance. On all ships, the Navigator is charged with supervising the preparation of each weather observation form and message per reference (v) if a weather team is not embarked. For Zumwalt class, weather reports will be required once a permanent communications suite is installed.

c. Responsibility for Review and Approval. The OOD, Meteorological and Oceanographic (METOC) Officer, or Duty Aerographer's Mate (AG) will review weather observation messages prior to release.

d. Retention. Keep each weather observation form on file as required, but not for less than six months. If utilizing J-OBS, which is preferred, retain receipt for 6 months.

18. Data Recording provided by ECDIS-N

a. Purpose. ECDIS-N is capable of recording, storing and downloading to removable media certain data elements to allow reconstruction of ship's track and verification of the official database(s) in use.

b. Instructions for Maintenance. The Navigator will ensure all hourly files generated by an ECDIS-N system while underway are backed up to a suitable storage medium, such as a server-based drive, or a local portable hard-drive, twice a month at a minimum. Once the last files generated during an underway have been saved, no further downloads are required while in-port.

c. Responsibility for Review and Approval. The Navigator is charged with ensuring the electronic back-up requirements are met.

d. Retention. Keep onboard 12 months from the last underway as part of the ship's official records.

APPENDIX A
SQUADRON/GROUP STAFF NAVIGATION ASSESSMENT

1. For a ship to be authorized for unrestricted navigation operations, it must successfully complete a Squadron/Group Staff (ISIC) Navigation Assessment based on the checklists included in this appendix (Exhibit A-1). All grading values will be graded using a whole point value (i.e., 0, 1, 2, 3, or 4, and for the VMS Proficiency section, Yes = 1, No = 0). Line items in italics are to be evaluated by the Senior Assessor. The purpose of a Navigation Assessment is to determine if, in the Squadron/Group Staff's judgment, the ship can safely navigate in Restricted Waters under specified conditions. All ships will be assessed against the Squadron/Group Staff Navigation Assessment Checklist.
2. Given the likely degradation of proficiency resulting from an extended in port period, the Loss of Steering drill will be conducted outside of Restricted Waters with the Sea and Anchor detail team still on watch. Also, this instruction recognizes that ships undergoing their Squadron/Group Staff navigation assessment will most likely have a minimum level of ship handling proficiency. The Precision Anchorage accuracy requirement point value is intentionally very low to account for this reality.
3. For CNSF, commands must follow the periodicity in table A-1 to ensure that all ships are maintaining full navigational capability at all times. The administration and material portions of the checklist will be completed by an ISIC Navigation Assessor prior to initial underway. The underway portion of the Squadron/Group Navigation Assessment is intended to be no less than 24 hours in duration (i.e., >24 hours) in order for the Senior Assessor to gauge a ship's proficiency both during Sea and Anchor Detail and open ocean operations. Additional casualty control or special evolutions can be added to the Navigation Assessment at the ISIC's discretion. ISICs will use the "Underway Operation" portion of the Squadron/Group Staff Navigation Assessment Checklist (Exhibit A-1) during the NSST Navigation Assessment contained in reference (c). LCS will be evaluated by COMLCSSRON ONE or COMLCSSRON TWO in the Littoral Combat Ship Training Facility (LTF) during Basic Phase utilizing the Squadron/Group Staff check sheet to complete their MOB-N 1.4 Harbor Navigation Package.
4. For CNAF, a failure of a Strike Group Staff Navigation Assessment, a lapsed periodicity (greater than 32 months since last assessment), a maintenance availability period six months or greater, a grounding or serious navigational error, or a Strike Group Staff determination that the ship is not meeting reasonable 'safety of ship' navigation standards, will put the ship into restricted navigation operations. The Strike Group Staff must conduct another Strike Group Staff Navigation Assessment, which the ship must pass, to re-validate that the ship has achieved a level of navigation readiness commensurate for unrestricted navigation operations. Until that time, the Strike Group Staff must embark sufficient, fully qualified personnel during each underway to ensure safe navigation.
5. Squadron/Group Staffs will provide a copy of the Squadron/Group Staff Navigation Assessment Checklist signed by the Senior Assessor, to the Commanding Officer authorizing the ship for unrestricted navigation operations including the use of ECDIS-N as the primary navigation plot, as appropriate (See Exhibit A-2). This will serve as the ship's authorization until the Squadron/Group Staff releases the official message via the chain of command to the appropriate TYCOM. Sample messages are provided as Exhibits A-3 through A-5.
6. Squadron/Group Staff will release a message to the appropriate TYCOM via the chain of command reporting successful completion of in-depth review of administration and material checks portions of the Squadron/Group Staff Navigation Assessment Checklist for ships under the Stoplight YELLOW periodicity criteria. Sample message is provided as Exhibit A-6.

7. For a ship's initial ECDIS-N authorization, the TYCOM must authorize unrestricted navigation operations. The Squadron/Group Staff will recommend authorization to the TYCOM utilizing the message template provided as Exhibit A-4, and the TYCOM will release a message authorizing unrestricted navigation operations including the use of ECDIS-N, as applicable, per the requirements of this instruction.

PIER SIDE TIME	STOP LIGHT	REQUIREMENTS
0 to 45 days	GREEN	Authorized "Unrestricted navigation operations;" standard Squadron/Group Staff oversight.
46 to 89 days	YELLOW	Squadron/Group Navigation Assessor will be required to conduct an in-depth review and assessment of the Administration and Material Readiness portion of navigation Assessment Checklist. The Senior Assessor is not required for this review and assessment, but may participate in any portion as schedule permits. A score of 80% is required for each section with no material casualties or personnel shortage that preclude underway operations as delineated in reference (t).
90 days or greater	RED	<p>Ship will be placed in restricted operations and the Squadron/Group Staff must embark sufficient, fully qualified personnel to ensure safe navigation. Squadron/Group Staff personnel will be required to get underway with the ship until such time that the Squadron/Group Staff re-validates that the ship has achieved a level of navigation readiness commensurate with unrestricted operations.</p> <p>The assessment sheet below will be completed in its entirety by the Squadron/Group Staff. A score of 80% is required for each section with no material casualties or personnel shortage that preclude underway operations as delineated in reference (t) to be cleared for unrestricted navigation operations. Continued operations at sea will require sufficient embarkation of fully qualified Squadron/Group Staff personnel to ensure that the ship operates safely. Sufficient personnel from the Squadron/Group Staff must, at a minimum, include a Navigation Assessor and any other personnel necessary as delineated by the Senior Assessor.</p> <p>Additionally, ships in RED status must successfully complete Navigation Seamanship and Ship-handling Training (NSST) simulation assessments as directed in reference (c) prior to getting underway.</p>

Table A-1 Navigation Periodicity Requirements for CNSF Ships

NOTE: LCS class ships may utilize the LTF to maintain proficiency following the completion of their MOB-N certification. If unable to get underway at sea, the crew shall schedule an underway assessment in the simulator with an LCSRON NTT observer. After successfully completing the underway assessment in the trainer, their pier side timer will reset to 0. This requirement should be further explained in the LCSRON NAVBILL or a separate instruction.

Squadron/Group Staff Navigation Assessment Checklist

Date: _____

Unit: _____
 NAVCERT DTG: _____
 Major DFS Number (if applicable): _____
 ATG NAV LTT Completion: _____
 Last BRM: _____
 NSST Hours: _____
 Senior Assessor: _____
 SME Assessors: _____

POA&M Dates

Admin Day: _____
 Operator Testing: _____
 Material Checks: _____
 Navigation Planning Process (including Navigation Brief): _____
 U/W Date: _____

1. The following items apply to all ships undergoing Squadron/Group Staff Navigation Assessment. The checklist is broken up into sections focused on administration, material readiness, VMS proficiency, and underway demonstration. Of note, the underway demonstration portion of this checklist will be used as the grade sheet for the NSST ISIC Navigation assessment found in reference (c). When completing this checklist, the full point value is awarded for “Yes,” and a zero point value is entered for “No.” The point value for items deemed “Not Applicable” is subtracted from the total points available to attain a final score. Minimum 80% score is required to pass. Line items in italics are to be evaluated by the Senior Assessor.

Administration	Points Awarded	Points Available
1. Is there a tailored Navigation Bill signed by the current CO or LCSRON for LCS that meets the requirements listed in Appendix J of the NAVDORM?		2
2. Is the Watch, Quarter, and Station Bill current, complete, and readily available to navigation personnel per SORM (reference (1))?		1
3. Does the organization provide for and designate personnel to pilot the ship in the following evolutions:		
a. During special sea and anchor detail?		1
b. During general quarters?		1
c. During low visibility?		1
d. During special evolutions?		1
4. Are all personnel assigned to a watch bill (underway and evolution) PQS and/or JQR qualified as applicable?		1

Administration	Points Awarded	Points Available
5. Has RADNAV course been completed by the ship once per MOB-N certification? (Effective date listed in Chapter 1).		1
6. Did all personnel assigned on the Sea and Anchor watch bill for all required watch stations pass a Navigation Rules of the Road exam during this assessment (per Chapter 1, paragraph 4.b.(1))?		1
7. Have all NSST simulator requirements been met per CNSP/L 3505.1B and COMNAVAIRFORINST 3500.20D?		1
8. Have Applicable VMS Advisories been reviewed upon receipt and incorporated into the navigation training plan?		1
9. Are qualified senior and experienced personnel on the watch bill as watch supervisors and/or assigned to training teams to ensure the thorough and professional performance of the watch teams?		1
10. Are thorough debriefs held following special evolutions so that lessons learned are gathered and briefed prior to the next similar evolution?		2
11. Have ship control personnel (OOD, JOOD, CONN, TAO, CICWO, CDCWO, TOPWO, QMOW/JOOW, EOOW, and BMOW) reviewed and initialed CO's Night Order Book?		1
12. Have ship control personnel reviewed and initialed CO's Standing Orders monthly?		1
13. Have all Navigation Team members (per Table 2-B through 2-D) reviewed and initialed the NAVDORM and ship's Navigation Bill quarterly?		1
14. Is the CO's Night Orders Book properly maintained and does it contain a copy of the CO's Standing Orders?		1
15. Is the Commanding Officer's Ready Chart list signed by the CO?		1
16. Are excerpts from the Act to Prevent Pollution from Ships, 1983 and the Clean Water Act of 1977 available to the OOD (OPNAVINST 5090.1 Series)?		1
17. Are ship's tactical data tables available to the OOD and Bridge/CIC plots?		1
18. Are the following logs properly maintained, reviewed and kept onboard for the required time period?		
a. Ship's Deck Log (reference OPNAVINST 3100.7)		1
b. Magnetic Compass Record Book (OPNAVINST 3120.32) (Not required for DFGMC) (12 months)		1
c. Bridge-to-Bridge R/T log. (reference ACP 125 series)		1
d. Navigation Workbook (12 months)		1
e. Standard Bearing Book (12 months)		1
f. Ship's Position Log (OPNAV 3100/3)		1
g. Weather Observation Log		1
h. Surface RADAR Contact Log (OPNAV 3100/5).		1
i. CIC Watch Log.		1
j. RADAR Navigation Log.		1
k. RADAR and Visual Navigation Points Listing (Gazetteer).		1
19. Verify the following instructions, documents and references are on board and up to date:		
a. Current or updated NAVSEA NAVCERT message on file and entered into Combat Systems Smooth Log (Major DFS Approval will count)		1

Administration	Points Awarded	Points Available
b. OPNAVINST 3100.7 (Deck Log)		1
c. COMPACFLTINST 3140.3 or COMUSFLTFORCOMINST 3140.9, Geospatial Product Allowances		1
d. COMNAVMETOCOMINST 3140.1 Meteorological Support.		1
e. COMNAVMETOCOMINST 3144.1 Weather Observation Manual.		1
f. Atlas of Pilot charts.		1
g. U.S. Navy Environmental Port Guides (formerly Typhoon/Hurricane Havens Handbook). Contact fnmoc.cdo@navy.mil or fnmoc.cdo.fct@navy.smil.mil to receive via DVD.		1
h. Tide and Current tables.		1
i. Weekly Notice to Mariners (paper or electronic copy)		1
j. Local Notice to Mariners (paper or electronic copy).		1
k. Summary of Chart/Pub Corrections.		1
l. Latest in-force MSI.		1
m. Current year Nautical Almanac.		1
n. NGA SRPUB 229 Vol. 1-5, NGA SRPUB 249 Vol. 1-3 (Sight Reduction Tables).		1
o. Catalog of Maps, Charts, and Related Products		1
p. COMNAVSURFPAC/COMNAVSURFLANT INSTRUCTION 3180.2, Fleet Underway Replenishment (UNREP)		1
q. USCG Navigation Rules and Regulations Handbook		1
r. Updated associated publications (technical and operator) for all installed navigational equipment		1
s. Navigation Light Certificate		1
t. Profile Light Plan.		1
u. Tonnage Certificate/Certificate of Admeasurement		1
v. Panama Canal Certificate (as applicable).		1
w. Total Tide.		1
x. Digital Nautical Publications Quarterly Update CD		1
y. Complete set of current DNCs, plus previous editions. (Including ship's with ECDIS-N installed but not yet certified)		1
z. Current monthly VDU, plus previous month's edition. (Including ship's with ECDIS-N installed but not yet certified)		1
aa. NSTM 420, Navigation Systems Equipment and Aids		1
ab. NSTM 422, Navigation and Signal Lights.		1
20. Is the full allowance of chart portfolios per COMPACFLTINST 3140.3 or COMUSFLTFORCOMINST 3140.9, Geospatial Product Allowances maintained on board?		1
21. Are appropriate steering casualty procedures available at all steering stations with individual responsibilities covered?		2
22. Are Speed and RPM tables posted at all conning stations or ships control stations? Are they readable in Low Light conditions?		1

Administration	Points Awarded	Points Available
23. Was the gyrocompass error and repeater error determined daily, reported to all navigation users, dated, posted on all gyrocompass repeaters, and logged in the Magnetic Compass Record Book and Deck Log?		1
24. Was the RADAR range and bearing error determined prior to getting underway, dated, posted on all RADAR repeaters, and logged in the Standard Bearing Book and CIC Watch/Navigation Log?		1
25. Are the following navigation evolution check lists available (non-laminated) and are they sourced from either the Ship's Navigation Bill or another CO approved instruction?		
a. Leaving and entering port		1
b. Low visibility		1
c. Swept channel piloting		1
d. Anchoring		1
e. Special Evolutions (UNREP, Flight Operations, etc.)		1
26. Are optimum scale charts (paper and DNC/ENC) available, corrected, and used at all stations?		2
27. Was the ship's draft determined and logged in the Ship's Deck Log prior to leaving/entering port?		2
28. Are tides and currents graphed and posted at all navigation stations for each applicable reference station?		2
29. Planning Process		
a. Was the Planning phase of the evolution thoroughly reviewed for validity and completeness prior to the Navigation Brief? (Incorporate items relating to reviewing the Debrief from previous ship events, reviewing lessons learned from NLLIS, reviewing critiques available via TYCOM portal, etc.)		2
30. Navigation Brief:		
a. Was the brief constructed per Appendix B?		2
b. Were all required personnel in attendance at the brief?		2
c. Was the brief given within 24 hours of evolution start?		2
31. Watch bills:		
a. Was the watch bill generated in RADM (ASM if installed) and approved by the CO?		2
b. Do the underway and special evolution watch bills include the Low Visibility Detail?		1
c. Are all personnel on the watch bill fully qualified for their position per Table 2-A?		2
d. Is the Individual Risk Management (IRM) Tool and/or crew endurance principles being used to ensure members on the watch bill receive sufficient rest prior to commencing the Sea & Anchor detail? Compare COND III watch bill with S&A watch bill. (e.g., Is the assigned Helm coming off mid-watch with little-to-no sleep?)		1

Administration	Points Awarded	Points Available
32. Paper Chart Preparation (Non ECDIS-N Certified ships Only)		
a. Are paper charts prepared per Chapter 4 paragraph 3?		2
b. Do Bridge and CIC charts match in all respects (i.e., corrections, labels, Chain of Command approval)?		2
33. Does the ship have the required number of VMS Operator School graduates for their installed version?		
a. CNSF (Per Table 2-A) 1. Navigator and ANAV 2. All QMs 3. OS: (3) for CRUDES and Amphibious ships; (1) for PCs; and (0) for MCMs and LCS) 4. For LCS class: (7) total (3 OODs, 3 JOODs and 1 Navigator) b. CNAF 1. (7), of which (2) must be Operations Specialists (OS)		2
Total:		
Average:		P / F

Material Readiness	Points Awarded	Points Available
1. Is sufficient normal and emergency lighting in good operating condition (e.g., is it possible to read the speed and RPM charts at night at the helm station)?		1
2. Is the following navigation equipment maintained and properly adjusted per the Preventive Maintenance System (PMS) requirements and applicable technical manuals? If required, are calibration curves or correction tables maintained and checked at prescribed intervals? Is the equipment in satisfactory operating condition? Is the equipment operated per the applicable technical manuals/operating instructions? Are the watch standers proficient in the use of the equipment and familiar with its limitations?		
a. Gyrocompass		2
b. Inertial Navigation System		2
c. Gyrocompass alarm		2
d. Gyro repeater benchmark alignment		2
e. Gyro repeaters (error posted and determined daily)		2
f. Alidades and bearing/azimuth circles		2
g. Navy Standard Magnetic Compass (NSMC) and/or Digital Flux Gate Magnetic Compass (DFGMC)		2
h. NAVSSI		2
i. EM Speed Log or NAVIKNOT		2
j. Fathometer		2

Material Readiness	Points Awarded	Points Available
k. Navigation RADAR		2
l. Bridge/CIC RADAR receivers (bearing/range error determined and posted daily)		2
m. Fire Control RADAR (as applicable)		2
n. Electronic Charting Equipment/ECDIS-N		
1) At least one ECDIS-N/VMS node operational.		3
2) At least one ECDIS-N/VMS workstation operational on the Bridge.		3
3) At least one ECDIS-N/VMS workstation operational in CIC.		3
o. Steering casualty alarm		2
p. DRT/DDRT/CADRT /Dead Reckoning Analyzer Indicator (DRAI)		2
q. Navigation lights/telltale panel		2
r. Ship's whistle		2
s. Bell and Gong (with lanyards attached)		2
t. Sextants		2
u. STELLA Program		2
v. Stadimeters		2
w. Barometer (with valid calibration sticker)		2
x. Internal Communications		2
y. Ship Control Console		2
z. GPS (PPS) Receivers		2
aa. Emergency Navigation Laptop (ENL)		2
ab. AIS		2
ac. Steering Units		2
ad. Rudders		2
ae. Rudder Indicators		2
af. Emergency alarms configured and operational (e.g., collision, GQ, etc.)		2
Total:		
Average:		P / F

Underway Operations	Points Awarded	Points Available
Restricted Waters Navigation		
1. Were accurate fixes taken per the NAVDORM and Ship's Navigation Bill?		4
3. Did the plotter enter observed LOPs vice accepting system generated values (ECDIS-N only)?		4
4. Was the Navigation report given as required per the NAVDORM and ship's Navigation Bill?		4
5. Did the CONN/Navigation Evaluator acknowledge reports?		4
6. Did the Navigation Evaluator properly supervise the Navigation Team?		4
7. Did the Navigation Evaluator refrain from becoming engrossed in any one aspect of piloting to the detriment of the overall navigation picture?		4

Underway Operations	Points Awarded	Points Available
8. <i>Did the Executive Officer properly monitor the Navigation Team performance?</i>		4
9. Did the Shipping Officer properly maintain the contact picture and provide relevant information and recommendations to the Bridge Team throughout the Restricted Waters Transit?		4
10. <i>Was communication between the Navigation Team, per chapter 2, effective?</i>		2
11. Were necessary logs properly maintained?		2
12. <i>Did the ship take proper actions per the USCG Navigation Rules and Regulations Handbook?</i>		2
13. <i>Was the plan that was briefed at the Navigation Brief executed as planned? If deviated, were all watch standers informed of the change and was it captured in the debrief to be applied to the next plan?</i>		2
14. If two consecutive fix intervals result in no fix, is the appropriate action taken (slow to bare steerageway until a fix is gained)?		2
15. Were proper external communications (i.e., BTB, FLT TAC, Flags, Lights, Day shapes) used?		2
16. Were the anchor(s) manned and ready for letting go?		2
17. Was set and drift correctly calculated and logged at appropriate intervals?		2
<u>Total:</u>		
<u>Average:</u>		P / F
<u>Low Visibility Navigation</u> (min 6,000yd leg with 15 degree turn)		
1. Did the Navigation Team properly maintain ship's position and were alternate fix sources utilized per the NAVDORM throughout low visibility?		4
2. <i>Did the Bridge Team recognize and take appropriate actions upon detecting low visibility situation per the NAVDORM, CO's Standing Orders, and the Ship's Navigation Bill?</i>		2
3. Were lookouts briefed on shipping, navigation picture, sounds signals, and navigation aids prior to reporting on station?		2
4. Did the Piloting Officer properly maintain the CIC navigation picture and provide relevant information and recommendations to the bridge?		2
5. <i>Did the ship take proper actions per the USCG Navigation Rules and Regulations Handbook while in the vicinity of, or in low visibility condition (sound signals, navigation lights, safe speed)?</i>		2
6. Did CIC properly maintain the surface picture and provide relevant information and recommendations to the bridge?		2
<u>Loss of Sensor/Loss of Primary Display (ECDIS-N Certified Only)</u>		
1. <i>Did the Bridge/Navigation Team recognize the casualty in a timely manner?</i>		2
2. Did discovering watch standers or directed personnel follow proper CSOSS/EOSS/NAVBILL procedures in response to the casualty (immediate, controlling actions, notification, etc.)?		2

Underway Operations	Points Awarded	Points Available
3. <i>Did the OOD understand current system limitations due to the casualty and take proper actions to ensure safe navigation of the ship?</i>		2
4. Did Navigation personnel maintain accurate navigation fixes during the casualty?		2
<u>Total:</u>		
<u>Average</u>		P / F
<u>Respond to Loss of Steering Casualty</u>		
1. Did the helmsman recognize the casualty and take the correct immediate/controlling actions per EOSS and CO's Standing Orders?		2
2. <i>Did the Bridge Team properly declare and respond to Loss of Steering per EOSS and CO's Standing Orders?</i>		2
3. Was the After Steering Helmsman aware of the ordered course and able to properly take control and maintain ordered course?		2
4. <i>Did the OOD maintain control of the emergency situation and continue to navigate the ship safely?</i>		2
5. Was common phraseology and formal communication used by the CONN, Helmsman, and After Steering Helmsman?		2
6. Were internal communications between the controlling stations effective?		2
<u>Total:</u>		
<u>Average:</u>		P / F
<u>Conduct a Precision Anchorage</u>		
1. Was PMAP signed by the CO?		1
2. <i>Did the Navigation Evaluator recommend course and speed changes to bring the ship over anchorage, taking into account current environmental conditions?</i>		2
3. Did the Navigation team provide range updates to the forecastle during the approach to anchorage?		2
4. Was a fix taken using all means available when the anchor was let go?		2
5. <i>Did the ship accurately determine anchored criteria were met, plot the location of the anchor and properly calculate the swing and drag circles?</i>		2
6. Accuracy: within 100 yds.		2
<u>Total:</u>		
<u>Average:</u>		P / F
<u>Conduct Open Ocean Navigation: (CNSF Only) Omit section for NSST Assessment</u>		
1. <i>Did the OOD Maintain safe navigation of the ship?</i>		4

Underway Operations	Points Awarded	Points Available
2. Did the OOD properly supervise the watch team (IAW SORM)		4
3. <i>Did the ship take proper actions IAW the Navigation Rules of the Road?</i>		3
4. Did the CONN properly supervise the helmsman?		1
5. Was common steering phraseology used by the CONN and helmsman?		1
6. <i>Were MOBOARDS/ARPA properly utilized to perform contact management and contact avoidance?</i>		1
7. Was Set and Drift computed/recorded and logged in the Deck Log correctly?		1
8. Were fix sources compared hourly to determine the ship's position?		1
9. Were electronic navigation systems properly set up and operated throughout the watch?		2
10. Were internal communications between the OOD, CONN, QMOW, CIC, and Lookouts effective?		2
11. Were proper external communications (BtB, Lights, Day Shapes, etc.) used?		1
12. Were all records and logs maintained as directed in Chapter 6 of the NAVDORM?		1
14. Were the Bridge and CIC teams qualified for their positions and assigned on an approved watch bill?		1
<u>Total:</u>		
<u>Average:</u>		P / F

VMS Proficiency Version 7.X.X. and 8.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
A. Knowledge or Skill Standard						
A1. Completed VMS Operator Course CIN A-061-0042	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
A2. Explain the requirements of the back-up plot	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B. SYSTEM SET UP - Can the Operator:						
Set up Sensor Inputs:	YES	YES	YES	YES	YES	YES
B1. Heading (HDG)	NO	NO	NO	NO	NO	NO
B2. Ground Speed (SOG)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B3. Speed through the Water (STW)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B4. Position (POS)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B5. Fathometer	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Validate Input/Setting of:	YES	YES	YES	YES	YES	YES
B6. Set and Drift	NO	NO	NO	NO	NO	NO
B7. Time and Time Zone	YES	YES	YES	YES	YES	YES

VMS Proficiency Version 7.X.X. and 8.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
	NO	NO	NO	NO	NO	NO
B8. Datum	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B9. Magnetic Variation	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B10. History Display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B11. Set up the Features per NAVDORM/ ship's NAVBILL/CO's Standing Orders	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B12. Set up the Safety Configuration per NAVDORM/ ship's NAVBILL/ CO's Standing Orders	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B13. Determine when an input has been lost/degraded	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B14. Recall ship's history data (time, position, heading, and speed at 1-min intervals)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C. CHARTS - Can the Operator:						
C1. Identify a Planning Sheet	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C2. Use the Chart Catalog to identify / load a chart	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C3. Identify the latest edition of DNC for the local area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C4. Identify the latest edition of TOD0 for the local area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C5. Load a DNC (only one library required)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Knowledge or Skill Standard						
C6. Load TOD0	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C7. Validate that the current local area SDNC is corrected up-to- date	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C8. Discuss what indications are received if the SDNC is out of date	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C9. Apply a VDU Correction to an uncorrected DNC (only one library required)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

VMS Proficiency Version 7.X.X. and 8.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
C10. Display updates for review and determine if they have been included in the SDNC	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C11. Verify update was applied correctly	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C12. Add a manual correction from a Local Notice to Mariners	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C13. Remove a manual correction	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C14. Display the record of updates	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C15. Display the log file of accepted/rejected corrections	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C16. Add a chart overlay	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C17. Add an area overlay	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C18. Create a Danger Area and an Informational Mariner Object for the scenario area, and attach to a Layer	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C19. Attach the Layer to the Harbor chart of the scenario area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C20. Create a chart portfolio for the scenario area suitable for going from pier to sea	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D. DISPLAY - Can the Operator:						
Knowledge or Skill Standard						
D1. Present a standard display at any time with a single operator action	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D2. Present a base display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D3. Present all other display settings	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D4. Set display defaults, and retrieve defaults	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D5. Change the ship symbol to Outline	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D6. Verify an 'Overscale' chart	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D7. Verify an 'Underscale' chart	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D8. Verify the Figure of Merit	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

VMS Proficiency Version 7.X.X. and 8.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
D9. Input a geographic coordinate and display that position	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D10. Change the True Motion Center	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D11. Change Center Area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D12. Reset Center Area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D13. Manually change the chart area and position of the ship relative to the edge of the display?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
E. SPECIAL EVENTS - Can the Operator:						
E1. Enter an Event mark	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
E2. Enter a Man Overboard	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
E3. Clear a Man Overboard	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F. NAVIGATION INFO - Can the Operator:						
F1. Query a point (i.e., sounding, wreck) an area (i.e., TSS, no-fishing) a layer object (i.e., manual correction, chart overlay) and determine the critical info for each	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F2. Add RADAR to the VMS display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F3. Verify the RADAR/chart alignment	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F4. Display the RADAR contact vectors in True and Relative	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F5. Remove the RADAR with a single operator action	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F6. Obtain range and bearing from three non-NAVAID conspicuous objects	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F7. Enable Visual/RADAR NAVAIDs	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F8. Create a three-LOP visual fix with true bearings	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F9. Create a three-LOP visual fix with relative bearings	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

VMS Proficiency Version 7.X.X. and 8.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
F10. Create a three-LOP RADAR fix	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F11. Create a three-LOP composite fix	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F12. Display the ship's assumed position and LOPs	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F13. Compare a fix from GPS and an EP generated from a visual/RADAR/composite fix	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F14. Build a Precision Anchorage	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F15. Determine and enter appropriate values for the Anchor Swing and Drag Circles	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G. VOYAGE PLANNING/MONITORING (Out of Home Port scenario) – Can the Operator:						
G1. Create a (minimum) of five-waypoints, two-turn Navigation Plan which uses the scenario chart portfolio and crosses at least one chart boundary	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Knowledge or Skill Standard						
G2. Enter a Critical Point at the chart boundary, with suitable text	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G3. Enter a Critical Point for a CPA with the safety contour, with suitable text	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G4. Create a Voyage Plan with the scenario objects	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G5. Successfully validate the Voyage Plan	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G6. Explain/demonstrate the approval of a Voyage and Navigation Plan	DEMO YES NO	DEMO YES NO	DEMO YES NO	DEMO YES NO	DEMO YES NO	DEMO YES NO
G7. Explain/Identify the Cross Track Error alarm	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G8. Identify when the chart isn't using the WGS-84 datum	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G9. Explain why a Slide Line may not show up on the display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
POINTS AWARDED (Yes=1, No=0)						
POINTS AVAILABLE						
AVERAGE						
PASS/FAIL (P or F)						

VMS Proficiency Version 9.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
A. Knowledge or Skill Standard						
A1. Completed VMS Operator Course CIN S-061-0008 / S-061-0044	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
A2. Explain the requirements of the secondary electronic plot	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B. SYSTEM SET UP- Can the Operator:						
Set up Sensor Inputs:	YES	YES	YES	YES	YES	YES
B1. Heading (HDG)	NO	NO	NO	NO	NO	NO
B2. Course Over Ground (COG)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B3. Speed Over Ground (SOG)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B4. Speed Through Water (STW)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B5. Position	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B6. Fathometer (DBK)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Validate Input/Setting of:	YES	YES	YES	YES	YES	YES
B7. Set and Drift	NO	NO	NO	NO	NO	NO
B8. Time and Time Zone	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B9. Datum in use	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Knowledge or Skill Standard (Only 3 operators for PC/MCM)						
B10. Magnetic Variation	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B11. Ownship History	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B12. Set up the User Profiles per NAVDORM/ship's NAVBILL/CO's Standing Orders	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B13. Set up the Ship Safety per NAVDORM/ship's NAVBILL/CO's Standing Orders	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B14. Determine when an input has been lost/degraded	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
B15. Recall ship's history data (time, position, heading, and speed at 1-min intervals)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C. CHARTS - Can the Operator:						

VMS Proficiency Version 9.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
C1. Identify a Planning Sheet	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C2. Use the Chart Index to identify/ load a chart	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C3. Identify the latest edition of electronic charts for the local area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C4. Load electronic charts (only one library required)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C5. Validate that the current local area electronic charts are corrected up- to-date	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C6. Discuss what indications are received if the electronic charts are out of date	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C7. Apply a correction to an uncorrected electronic chart (only one library required)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C8. Verify update was applied correctly	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C9. Add a manual correction from a Local Notice to Mariners	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C10. Remove a manual correction	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C11. Display the record of Manual Chart Updates (applied/deleted)	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C12. Display the Deleted Mariner Object Log	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
C13. Create a Danger Area and an Informational Manual Chart Update for the scenario area and attach to a Layer	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D. DISPLAY - Can the Operator:						
D1. Present a standard display at any time with a single operator action	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D2. Present a base display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D3. Present all other display settings	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D4. Display the ship symbol and then display True Scale Ship	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D5. Verify an 'Overscale' chart	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D6. Verify the Figure of Merit	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

VMS Proficiency Version 9.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
D7. Input a geographic coordinate and display that position	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D8. Change the True Motion Center	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D9. Change Center Area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D10. Reset Center Area	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
D11. Manually change the chart area and position of the ship relative to the edge of the display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
E. SPECIAL EVENTS - Can the Operator:						
E1. Enter an Event mark	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
E2. Enter a Man Overboard	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
E3. Clear a Man Overboard	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F. NAVIGATION INFO - Can the Operator:						
F1. Query a point (e.g., sounding, wreck), an area (e.g., TSS, no-fishing), and a layer object (i.e., manual chart update) and determine the critical info for each	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F2. Add RADAR to the VMS display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F3. Verify the RADAR/chart alignment	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F4. Display the RADAR contact vectors in True and Relative	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F5. Remove the RADAR with a single operator action	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F6. Obtain range and bearing from three non-NAVAID conspicuous objects	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F7. Display Visual/RADAR NAVAIDs	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F8. Create a three-LOP visual fix with true bearings	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F9. Create a three-LOP visual fix with relative bearings	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F10. Create a three-LOP RADAR fix	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

VMS Proficiency Version 9.X.X.	Nav	Senior QM	Piloting Officer	VMS Op	VMS Op	VMS Op
F11. Create a three-LOP composite fix	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F12. Display the ship's assumed position and LOPs	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F13. Compare a fix from GPS to LOP fixes: visual/RADAR/composite fix	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F14. Build a Precision Anchorage	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
F15. Determine and enter appropriate values for the Anchor Swing and Drag Rings	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G. VOYAGE PLANNING/MONITORING (Out of Home Port scenario) – Can the Operator:						
G1. Create a (minimum) five-waypoint, three-turn Nav Plan which crosses at least one chart boundary	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G2. Enter the charts needed for the scenario in the Nav Plan	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G3. Enter a Critical Point at the chart boundary, with suitable text	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G4. Enter a Critical Point for a CPA with the safety contour, with suitable text	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G5. Create a Route with the scenario objects	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G6. Successfully validate the Route	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G7. Explain/demonstrate the approval of a Route and Nav Plan	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G8. Explain/Identify the Off Track alarm	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G9. Identify when the chart isn't using the WGS-84 datum	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
G10. Explain why a Slide Bar may not show up on the display	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
POINTS AWARDED (Yes=1, No=0)						
POINTS AVAILABLE						
AVERAGE						
PASS/FAIL (P or F)						

Exhibit A-1 Squadron/Group Staff Navigation Assessment Checklist

Squadron/Group Staff Navigation Assessment
Final Assessment Sheet

Area	Points Awarded	Points Available	Total (%)	Notes
Administration				Minimum 80% score to pass
Material Readiness				Minimum 80% score to pass
Underway Operations				Minimum 80% score to pass
NSST RoR Average				During NSST Watch Team Evaluation. Minimum 90% score to pass
VMS Proficiency				Minimum 80% score to pass

NOTE: Ships must achieve a passing score in all sections listed above and receive a recommendation from Senior Assessor.

Feedback: _____

USS _____ **IS / IS NOT AUTHORIZED FOR UNRESTRICTED NAVIGATION OPERATIONS USING PAPER PLOT / ECDIS-N. MESSAGE TO FOLLOW.**

 Senior Assessor

 Date

**Exhibit A-2 Squadron/Group Staff Navigation Assessment
 Final Assessment Sheet**

ADMINISTRATIVE MESSAGE
ROUTINE
R XXXXXXZ MMM YY
FM SQUADRON/GROUP STAFF
TO COMNAVSURFLANT NORFOLK VA or COMNAVSURFPAC SAN DIEGO CA or
COMNAVAIRLANT NORFOLK VA or COMNAVAIRPAC SAN DIEGO CA (as applicable)
USS SHIP
INFO CNO WASHINGTON DC
COMUSFLTFORCOM NORFOLK VA or COMPACFLT PEARL HARBOR HI (as applicable)
APPROPRIATE NUMBERED FLEET COMMANDER
COMAFLOATRAGRU ATLANTIC NORFOLK VA / COMAFLOATRAGRUPAC SAN DIEGO CA
(as applicable)
APPROPRIATE AFLOAT TRAINING GROUP
BT
UNCLAS
MSGID/GENADMIN/SQUADRON/GROUP STAFF /-/MONTH//
SUBJ/USS SHIP (HULL NUMBER) NAVIGATION ASSESSMENT REPORT//
REF/A/DOC/CNAF-CNSF/DDMMYY//
AMPN/CNAF-CNSFINST 3530.4F NAVDORM.//
RMKS/1. PER REF A USS SHIP CREW PROFICIENCY NAVIGATION ASSESSMENT WAS
COMPLETED ON DD MMM YY. DETAILS OF THE ASSESSMENT WERE DISCUSSED WITH
THE COMMANDING OFFICER.
2. USS SHIP IS AUTHORIZED FOR UNRESTRICTED NAVIGATION OPERATIONS USING
PAPER PLOT.//
BT
NNNN

**Exhibit A-3 Sample Squadron/Group Staff Navigation Assessment
Report (Non-ECDIS-N)**

ADMINISTRATIVE MESSAGE

ROUTINE

R XXXXXXZ MMM YY

FM SQUADRON/GROUP STAFF

TO COMNAVSURFLANT NORFOLK VA or COMNAVSURFPAC SAN DIEGO CA or
COMNAVAIRLANT NORFOLK VA or COMNAVAIRPAC SAN DIEGO CA (as applicable)

USS SHIP

INFO CNO WASHINGTON DC

COMUSFLTFORCOM NORFOLK VA or COMPACFLT PEARL HARBOR HI (as applicable)

APPROPRIATE NUMBERED FLEET COMMANDER

COMAFLOATRAGRU ATLANTIC NORFOLK VA / COMAFLOATRAGRUPAC SAN DIEGO CA
(as applicable)

APPROPRIATE AFLOAT TRAINING GROUP

BT

UNCLAS

MSGID/GENADMIN/SQUADRON/GROUP STAFF /-/MONTH//

SUBJ/USS SHIP (HULL NUMBER) ECDIS-N NAVIGATION ASSESSMENT REPORT//

REF/A/DOC/OPNAV/15FEB01//

REF/B/GENADMIN/SPAWAR/XXXXXXZMMMY//

REF/C/DOC/DFS (AS APPLICABLE)

REF/D/DOC/CNAF-CNSF/DDMMYY//

NARR/REF A IS OPNAVINST 9420.2 IMPLEMENTATION OF ECDIS-N

CERTIFICATION PROCESS. REF B IS NAVCERT MSG. REF C IS CNSP/CNAP/CNSL/CNAL
INST 3530.4F NAVDORM. REF D IS DFS NR XXX FOR EQUIPMENT (AS APPLICABLE).//

RMKS/1. PER REF A, USS SHIP NAVIGATION EQUIPMENT CERTIFICATION WAS
COMPLETED BY SPAWAR SYSTEMS CENTER ATLANTIC ON DD MMM YY AND IS
DOCUMENTED BY REF B. THE SHIP IS OPERATING UNDER A MAJOR DEPARTURE FROM
SPECIFICATIONS PER REF C (AS APPLICABLE).

2. PER REF D, A SQUADRON/GROUP STAFF CREW PROFICIENCY NAVIGATION
ASSESSMENT WAS COMPLETED ON DD MMM YY. DETAILS OF THE ASSESSMENT WERE
DISCUSSED WITH THE COMMANDING OFFICER.

*3. PER REF D, USS SHIP IS AUTHORIZED FOR UNRESTRICTED NAVIGATION OPERATIONS
USING ECDIS-N.//

BT

NNNN

* Use the following for INITIAL Certification:

3. PER REF C, USS SHIP IS RECOMMENDED FOR UNRESTRICTED NAVIGATION
OPERATIONS USING ECDIS-N.

**Exhibit A-4 Sample Squadron/Group Staff Navigation Assessment
Report (ECDIS-N)**

ADMINISTRATIVE MESSAGE
ROUTINE
P XXXXXXZ MMM YY
FM USS SHIP NAME
TO ISIC
INFO CNO WASHINGTON DC
COMUSFLTFORCOM NORFOLK VA or COMPACFLT PEARL HARBOR HI (as applicable)
APPROPRIATE NUMBERED FLEET COMMANDER
COMAFLOATRAGRU ATLANTIC NORFOLK VA / COMAFLOATRAGRUPAC SAN DIEGO CA
(as applicable)
APPROPRIATE AFLOAT TRAINING GROUP
USS SHIP NAME
BT
UNCLAS
MSGID/GENADMIN/USS SHIP/ /-/MONTH//
SUBJ/ Ship's Name REQUEST FOR INTERIM ECDIS-N AUTHORIZATION//
REF/A/CNSP/CNAP/CNSL/CNAL INST 3530.4F//
AMPN/SURFACE SHIP NAVIGATION DEPARTMENT ORGANIZATION AND REGULATIONS
MANUAL//
POC/NAME/CDR/NAVIGATOR/ SHIP NAME // EMAIL: POC(AT)CVNXX.NAVY.MIL//
RMKS/1. INPORT ECDIS-N LTT COMPLETED DDMMYY.
NAVCERT ECDIS-N VERIFICATION INPORT TESTING COMPLETED DDMMYY.
2. PER REF A, USS SHIP REQUEST ECDIS-N 180 DAY INTERIM AUTHORIZATION
TO SUPPORT UNDERWAY ECDIS-N LTT DDMMYY.//
BT
#0003
NNNN

**Exhibit A-5 Sample Request from Ship to ISIC for 180-Day
Interim ECDIS-N Authorization**

ADMINISTRATIVE MESSAGE

ROUTINE

R XXXXXXZ MMM YY

FM SQUADRON/GROUP STAFF

TO COMNAVSURFLANT NORFOLK VA or COMNAVSURFPAC SAN DIEGO CA or
COMNAVAIRLANT NORFOLK VA or COMNAVAIRPAC SAN DIEGO CA (as applicable)

USS SHIP

INFO CNO WASHINGTON DC

COMUSFLTFORCOM NORFOLK VA or COMPACFLT PEARL HARBOR HI (as applicable)

APPROPRIATE NUMBERED FLEET COMMANDER

COMAFLOATRAGRU ATLANTIC NORFOLK VA / COMAFLOATRAGRUPAC SAN DIEGO CA
(as applicable)

APPROPRIATE AFLOAT TRAINING GROUP

BT

UNCLAS

MSGID/GENADMIN/SQUADRON/GROUP STAFF /-/MONTH//

SUBJ/USS SHIP (HULL NUMBER) IN DEPTH NAVIGATION ASSESSMENT REPORT//

REF/A/DOC/CNAF-CNSF/DDMMYY//

AMPN/CNAF-CNSFINST 3530.4F NAVDORM.//

RMKS/1. PER REF A, NAME OF GROUP/SQUADRON REPRESENTATIVE CONDUCTED AN IN
DEPTH REVIEW OF USS SHIP HAVING BEEN INPORT GREATER THAN 45 DAYS.

ADMINISTRATION AND MATERIAL SECTIONS OF APPENDIX A WERE ASSESSED AT A
SCORE OF 80 PERCENT OR GREATER. (IF ANY OTHER ITEMS WERE ASSESSED, INCLUDE
ITEMS HERE). DETAILS OF THE ASSESSMENT WERE DISCUSSED WITH THE
COMMANDING OFFICER.

2. USS SHIP IS AUTHORIZED FOR UNRESTRICTED NAVIGATION OPERATIONS USING
ECDIS-N (OR PAPER PLOT IF NOT YET AUTHORIZED).//

BT

NNNN

**Exhibit A-6 Sample Squadron/Group Staff Navigation Assessment
In-Depth Review Report**

APPENDIX B
NAVIGATION BRIEF

1. Required Attendance (signed muster required):
 - a. Commanding Officer
 - b. Executive Officer
 - c. Operations Officer
 - d. Navigator
 - e. Engineer Officer
 - f. Plant Control Officer (PCO) (when assigned)
 - g. Reactor Officer (when assigned)
 - h. First Lieutenant
 - i. CIC Officer/CICWO
 - j. Assistant Navigator (when assigned)
 - k. CIC Surface Watch Officer
 - l. Piloting and Shipping Officers
 - m. METOC Officer/AG (when assigned)
 - n. Helm Safety Officer
 - o. Aft Steering Safety Officer
 - p. Bridge Sea and Anchor Detail Team (OOD, JOOD, CONN, etc.)
 - q. Helm/Lee Helm
 - r. Senior QM and OS
 - s. Staff Surface Operations Officer (when assigned)
 - t. Safety Observers
 - u. Other personnel as directed (e.g., Linehandling POICs, etc.).
2. Contents of brief (Items will be briefed by the personnel listed and can be briefed in any order the command chooses):

a. Arrival/departure time – Navigator/ANAV

(1) Consideration of options

- (a) Tides
- (b) Currents
- (c) Speed Restrictions
- (d) Operational imperatives for timing of arrival, or not

(2) Operational Requirements

- (a) Conditions of readiness
- (b) Tactical situation
- (c) Time and Distance alternative
- (d) Internal and external communications plan
- (e) EMCON and RADAR radiation restrictions

b. Weather - METOC Officer/AG/Navigator/ANAV/QM

c. Tides/currents – Navigator/ANAV/OOD/CONN

(1) Tides graphed using the Quarter/Tenth method, or printed from an approved electronic program, for the complete day.

(2) Currents graphed using straight-line method, or printed from an approved electronic program, for the complete day for each leg.

(3) Ebb/Flood velocity and directions at maximum velocity noted on graph. Tides/Currents readily available at all ship control stations with copies to CO, XO, NAV, OOD, CONN, etc. Tables do not have to be physically 'posted'.

d. Astronomical data – Navigator/ANAV/QM: Sunrise, sunset, moonrise, and moonset, lunar illumination, background illumination, expected radar ranges, visibility restrictions and cloud cover including go/no-go criteria.

e. Charts – Navigator/ANAV

- (1) Latest editions with corrections verified (paper and/or DNC)
- (2) Corrections/changes since last brief
- (3) Type of buoyage system
- (4) GPS Datum to be used with each chart

(5) Chart numbers and chart name to be used

(6) The date of NAVSEA NAVCERT (MSG DTG). If ship is operating on a DFS, list the date the DFS was approved and when it expires.

f. Track - Navigator/ANAV/Conning Officer

(1) Courses/distance/speeds/safe speeds

(2) Danger bearings and ranges

(3) Designated shoal water and danger soundings

(4) Depth/width of channel, turning basin, etc.

(5) Shallow water effects (if applicable)

(6) Significant NAVAIDS, terrestrial ranges

(7) Vessel traffic separation scheme/check in/out points/mandatory and voluntary, intended entry, exit and crossing points

(8) Line of Demarcation

(9) Degaussing area

(10) Anticipated traffic

(11) Pier heading

(12) Description of anchorage or mooring

(13) Type of bottom (anchorage)

(14) Head/drop bearings (anchorage)

(15) Amount of anchor chain required (anchorage) based on ship-specific nomograph using forecast winds and current at anchorage

(16) Entering/exiting precautionary areas

(17) Rudder angles and speeds

(18) Pilot pick-up/drop off plan

(19) Ship handling Plan (i.e., tug usage, environmental factors, maneuvering)

g. Ground tackle - First Lieutenant/Asst. First LT/Ship's Boatswain/OOD/OPS

- (1) Ready anchor - port/stbd/centerline
 - (2) Scope of chain
 - (3) Status of windlass/winches
 - (4) Special mooring buoy procedures
 - (5) Mooring plan
 - (6) Method of letting go/weighing the anchor referencing NSTM 581
 - (7) Ready life boat status
 - (8) Boats in the water
 - (9) Accommodation ladder up/down
 - (10) Anchoring Nomograph
- h. Operational considerations - Operations Officer/CICO/Shipping Officer
- (1) Entering/Departing movements (military/civilian)
 - (2) Harbor special events
 - (3) Media coverage
 - (4) Flight ops (FOD/VERTREP/PAX Transfer)
 - (5) Hot areas
- i. Tugs and pilots – Navigator/ANAV/OOD /CONN
- (1) Tug/Pilot (Harbor/Bar) pick up/drop off arrangements
 - (2) Communications
- j. Status of navigation equipment – Navigator/ANAV/CSO/EMO
- (1) Compass/Repeater errors
 - (2) Degraded/OOC equipment, impact, and ETR
 - (3) Backup systems
 - (4) ECDIS-N/Situational Awareness system
 - (5) Navigation/Surface RADARs

NOTE: Any NAVSEA-installed electronic navigation systems are to be used for situational awareness during restricted waters transits, but must not be used as primary or secondary plot. Mention of this policy should be included in the navigation brief.

k. Status of engineering plant - Engineer Officer/Reactor Officer/PCO

- (1) Plant status/configuration
- (2) Limiting casualties and go/no-go criteria
- (3) Degaussing monitors
- (4) Steering Gear status

l. Special considerations/events – Navigator/ANAV

- (1) Honors
- (2) Flag Officer movements
- (3) Visitors
- (4) Harbor exercises
- (5) Debrief/Hot wash schedule
- (6) Uniform
- (7) Watch Bill including approval authority required for substitutions, and relief plan (as required for meals and crew endurance)

m. Emergencies – OOD/CONN/Helm and Aft Steering Helm Safety Officers/Helmsman and Aft Steering Helmsman. This list is not all-inclusive and is only the minimum required. Ships are encouraged to include additional casualties based on equipment limitations, harbor/port familiarization, etc.

- (1) Steering/Engineering casualties
- (2) Man overboard
- (3) Loss of gyros/RADAR/communications
- (4) Reduced visibility and safe speed
- (5) Emergency anchorage locations and go/no go criteria

n. Force protection plan – WEPS/Force Protection Officer/OOD/Gunnery Liaison Officer

- (1) Shipboard Force Protection Watches
- (2) Small boat escorts

(3) Pre-Planned Responses (PPRs) and go/no-go criteria

(4) Communication plan and timing and positioning of service craft and service positions

o. Risk assessment - Navigator/Safety Officer/ANAV

(1) Individual Risk Management (IRM) Assessment. Per reference (y), ships will include IRM as part of operational risk management in both routine operations, as well as special evolutions. IRM is a process which ensures that the proficiency, currency, and fatigue levels of key watch standers are accounted for when preparing to conduct operational evolutions. Figure B-1 is an example tool to assess IRM and can be tailored to individual platforms.

(a) TAO (CICWO if not assigned)

(b) OOD

(c) JOOD

(d) CONN

(e) Navigation Evaluator

(f) Piloting Officer

(g) SUWC (if assigned)

(h) Shipping Officer

(i) EOOW

(j) CSOOW

(k) Other applicable watch stations

(2) Operational Risk Management (ORM)

(a) Collision

(b) Grounding

(c) Navigation equipment malfunction

(d) Communications failure

(e) Man overboard

(f) Breakdown in Bridge Resource Management

(g) Steering/Propulsion casualty

(h) Lessons Learned and Discussion Points

(i) Go/No-go criteria and decision points

p. Assessment of ship’s position relative to hazards for watch team turnover – Navigator. For instance, if transiting in a TSS or high density shipping areas, assess items such as the timing of setting the special detail in preparation for operations in these areas, and at which point watch stander turn over occurs during the evolution.

3. Review and Retention.

a. At the completion of the Navigation Brief the Navigator will sign and forward the original brief cover letter for approval.

b. Forward to the XO for signature, and forward to CO for approval.

c. CO will approve and sign.

d. Navigator will maintain file copy of brief, signed muster sheet, tides and currents, and watch bill as required, but not less than twelve months. Copies may be electronic, but electronic copies must have required signatures and not be editable documents.

<h1>Individual Risk Management Tool</h1>					
Watch station	Watch / Rest	Experience	Weather	Equipment	IRM
OOD: LT RED	2	4	3	2	11
CONN: ENS BLUE	3	2	3	2	10
HELM: BM3 GREEN	2	1	3	2	8
LEE HELM: EN3 ORANGE	3	4	3	2	12
NAV EVALUATOR: LTJG WHITE	3	1	3	2	9
OVERALL	13	12	15	10	AVG 10
Watch to Rest Ratio: 4 – No watch leading into event, 7 hrs sleep in last 24 hrs 3 - Stood a full watch before event, 7 hrs sleep in last 24 hrs 2 – Between 5 and 7 hrs sleep in last 24 hrs 1 – Less than 5 hrs sleep in last 24 hrs	Experience: 4 – 11 or more details in last 3 mos 3 – 5-10 details in last 3 mos 2 – Less than 5 details in last 3 mos or U/I 1 – First time as qualified watchstander	Weather: 4 – Good 3 – Moderate 2 – Significant 1 – Heavy Equipment: 4 – All Equipment operational 3 – Moderately degraded Equip 2 – Severely degraded Equip 1 – Primary / backup Equip OOC	IRM Code: <8: Critical 8-10: Serious 11-12: Moderate 13-14: Minor 15-16: Negligible		

Figure B-1 Sample Individual Risk Management Tool

APPENDIX C
 SAMPLE CHECKLISTS

1. Checklists. The following samples, at a minimum, must be included when developing checklists and will be included in the ship's NAVBILL. The chronological sequence and timeline of events will be determined by the individual command.

Getting Underway Checklist

Event	COG	Initials
<i>When Conditions are met Prior to Getting Underway</i>		
1. Energize master gyrocompass/Inertial Navigation System per CSOSS and/or technical manual requirements	ENG/CSO Duty IC/ET	
2. DEFRAG VMS Hard drives (Ships equipped with VMS)	CSO Duty IC/ET	
<i>24 Hours Prior to Getting Underway</i>		
3. Conduct navigation brief	NAV	
4. Assume radio guard	OPS	
5. Arrange for tugs/line handlers	OPS	
6. Verify schedule for lighting off the plant	ENG/REAC	
7. Notify ships in nest	OPS	
8. Check OPORD for required reports	OPS	
9. Verify lifeboat assignment list is current and posted	OPS	
10. Complete all pre-underway steering gear PMS checks	AUXO	
11. Verify all VMS nodes display setting per NAVBILL.	NAV	
12. Ensure all GPS receivers are keyed and operational.	EMO	
<i>2 Hours Prior to Getting Underway</i>		
12. Ascertain from the XO:	OOD	
a. If any variation in the standard time for stationing the Special Sea and Anchor detail	OOD	
b. Disposition of boats	OOD	
c. Instructions concerning U.S. and guard mail	OOD	
d. Number of passengers and time of arrival	OOD	
e. Uniform for getting underway	OOD	
13. Start hoisting boats when OOD no longer requires their use, after obtaining permission of the XO/CO	OOD	
14. Rig in booms and accommodation ladders and secure them for sea, after obtaining permission of the XO	OOD	
15. Have the word passed giving time for getting underway	OOD	
16. Energize and check all CIC equipment, including RADAR range scales and internal communication circuits	CICO/CDCO	
17. Conduct radio checks	COMMO	
18. Shift from shore power to ship's power	ENG/REAC	
19. Check all gyro repeaters against master gyro and report error	NAV	
20. Adjust bridge RADAR repeaters	OOD/CICO	

Event	COG	Initials
21. Set appropriate material condition	DCA/ DCPOs	
22. Clear ship of visitors and inspect for stowaways	CMAA	
23. Postal Clerk makes last mail run	LS	
24. Ascertain time for heaving around on anchor chain or taking in lines	CDO/OPS	
25. Check power source, switch operation, oil level, and manual/electric brakes on Anchor Windlass	ELECTRO	
26. Pass word, "All hands shift into the uniform for getting underway"	OOD	
27. Muster the crew on station	DIVO	
<i>30 to 60 Minutes Prior to Getting Underway</i>		
28. Pass word, "Go to your stations all special sea and anchor detail" (twice). When relieved by the OOD underway pass the word, "The Officer of the Deck has shifted his watch from the Quarterdeck to the Pilot House."	OOD IN-PORT	
29. Man after steering and the pilot house. Safety test steering gear, communications, and emergency alarms	OOD/ENG/ HELM	
30. Test engine order telegraph and revolution indicator	OOD/ENG/ HSO	
31. Test navigation lights	OOD	
32. Manned and ready reports from the following stations:	OOD	
a. Forecastle		
b. Fantail		
c. Amidships		
d. Signal Bridge		
e. Pilot House		
f. Main Control/CCS		
g. CIC/MCC		
h. After Steering		
i. Fire Control		
33. Test Fathometer	NAV/ASWO	
34. Test sound powered phone circuits	OOD	
35. Receive departmental reports of readiness for sea:	OOD	
a. OPS		
b. WEPS/CBS		
c. SUPPLY		
d. ENG/REAC		
e. NAV/ADMIN		

Event	COG	Initials
36. Record ship's draft both fore and aft	DCA	
37. Direct EOOW to report when main engines are ready to be tested. Upon receipt of this report, obtain permission from the Commanding Officer to test the main engines and direct main control, accordingly. A qualified OOD underway must be on the bridge when testing the main engines. In particular, he/she will ensure the stern area is clear, all mooring lines are doubled and properly secured, and the brow is in such a position that if the ship moves the brow will not be damaged.	OOD	
38. Disconnect utility lines from the pier with the exception of phone line	ENG	
39. Complete all SSDG pre-underway PMS checks	AUXO	
<i>15 to 30 Minutes Prior to Getting Underway</i>		
40. Rig in booms and davits as boats are hoisted or cleared away	1st LT	
41. Request permission to get underway from SOPA	OOD	
42. Test ship's whistle	OOD	
43. Alarms set to "at sea" position	ELECO	
44. Test gyro (failure) alarm	ELECO	
45. Test hand-held radios (bridge/fantail/forecastle)	COMMO	
<i>Within 15 Minutes Prior to Getting Underway</i>		
46. Disconnect phone lines	Duty IC	
47. Rig in brow	OOD	
48. If moored to a buoy, take in chain or wire and ride to manila lines when directed	OOD	
49. Report, "Ready to answer all bells"	ENG	
50. Pass word, "All hands topside fall into port/starboard for getting underway"	OOD	
51. Report ready to get underway to the XO, who will report to the CO	OOD	
<i>Immediately prior to getting underway</i>		
52. Set Restricted Maneuvering in Main Control	OOD	
53. Inform Main Control to, "Stand by to answer all bells"	OOD	
54. Make SECURITE call	JOOD	
55. Log completion of checklist in the ship's Deck Log and deliver to the Navigator	OOD	

Exhibit C-1 Sample Getting Underway Checklist

Entering Port/Restricted Waters Checklist

Inbound: _____

Date: _____

Event	COG	Initials
<i>When Conditions are met Prior to Entering Port/Restricted Waters</i>		
1. Pump bilges prior to 50 NM limit (CO permission required)	EOOW/ OOD	
2. Cease dumping of shreddable metal & glass prior to 12 NM from land	SUPPO/ OOD	
<i>24 – 12 Hours Prior to Entering Port/Restricted Waters</i>		
3. Conduct Navigation Brief	NAV	
4. Conduct Intentional Auto-Compensation of DFGMC	OOD	
5. Review RADAR radiation restrictions for the local area; brief at Navigation Brief	FCO	
6. Verify all VMS nodes display setting per NAVBILL.	QMOW	
7. Verify completion of all required EOSS and CSOSS checks (based on Departmental MLOCs and Check Off Lists)	EOOW	
	CSOOW	
<i>When Conditions are met Prior to Entering Port/Restricted Waters</i>		
8. Display speed flags	OOD	
9. 45 minutes prior to approaching land to within 12 NM, inform EOOW to secure distilling water	OOD/ NAV	
10. “Station the Modified Navigation Detail” per the ship’s NAVBILL.	OOD/ NAV	
11. Prior to entering restricted waters, pass the word: “Station the Sea and Anchor Detail. Station the Restricted Maneuvering Detail”	OOD	
<i>2 Hours Prior to Entering Port/Restricted Waters</i>		
12. Lay out mooring lines and raise jack staff and flagstaff	1 st LT	
13. Confirm pilot/tug services	OPS	
14. Clean bridge windows	NAV/ BMOW	
15. Centerline and safe weapons systems as appropriate	TAO/ WEPS	
16. Ensure VHF bridge to bridge radio is operational	OOD	
17. Rig accommodation/boat/pilot ladder as necessary	1 st LT	
<i>1.5 Hours Prior to Entering Port/Restricted Waters</i>		
18. Test ship’s whistle (CO permission required) (Ensure no personnel aloft)	OOD	
19. Verify bull horn, wood chips and chemical lights are available on bridge wing	JOOD	
20. Set up bridge wing communications: BTB radio remote, bridge wing sound-powered phone to SCU	QMOW	
21. Conduct time check on 1MC	QMOW	
22. Deliver Draft Report to OOD	DCA	

Event	COG	Initials
23. Compute: a. True wind _____ b. Set/drift _____ c. Water depth at anchorage _____ d. Type bottom at anchorage _____	NAV	
24. Update gyro error on all gyro repeaters	NAV	
25. Provide tide and current information	NAV	
<i>1 Hour Prior to Entering Port/Restricted Waters</i>		
26. Order CCS to full power	OOD	
27. Conform to local RADAR radiation restrictions	CSC	
28. Review EOCC for loss of steering procedures	OOD/ Helm/ Aft St	
29. Shine bell	SUPPO/ Inport OOD	
30. Shift pit sword to dummy log	CSOOW	
31. Pass the word: "Check the setting of material condition Yoke; make reports to CCS"	DCA/ OOD	
<i>When Conditions are met Prior to Entering Port/Restricted Waters</i>		
32. 15 minutes prior to approaching land to within 3 NM, inform CCS to place VCHT in transit mode	OOD/ NAV	
33. Pass the word: "All departments make readiness for entering port reports to the Executive Officer on the bridge. "Ship Name" will (anchor/moor) (port/stbd) side to at (anchorage/ pier/berth)"	OOD	
34. Pass the word: "All hands shift into the uniform for entering port. The uniform for entering port is _____ for officers and chief petty officers and _____ for first class petty officers and junior"	OOD	
35. Make anchor ready for use	1st LT	
36. Establish comms and request permission to enter port from proper authority (as required)	OOD	
37. When IVO harbor/port, issue securite call: "Securite, Securite, Securite. This is U.S. Navy Warship ?? inbound IVO _____, bound for _____ (harbor/port, berth/pier), standing by Channels _____ for any concerned traffic, out"	TACCOM	
<i>30 Minutes Prior to Entering Port/Restricted Waters</i>		
38. Receive manned and ready reports:	XO	
a. Operations		
b. WEPS/CBS		
c. Engineering		
d. Navigation/Admin		

Event	COG	Initials
e. Supply		
39. Start off-line HPUs	OOD	
<i>15 Minutes Prior to Entering Port/Restricted Waters</i>		
40. Receive manned and ready reports:	OOD	
a. Nav Team		
b. Signal Bridge		
c. After Steering		
d. CIC/MCC		
e. Forecastle		
f. Fantail		
g. Midships		
h. Anchor Windlass		
i. CCS		
j. CSMC		
41. Report "Ship manned and ready for entering restricted waters" to the Commanding Officer (Deck log entry required)	XO	
42. Place Restricted Maneuvering Doctrine in effect (CO permission required). If permission granted, pass the word: "Restricted Maneuvering Doctrine is in effect"	OOD	
<i>In Restricted Waters</i>		
43. Secure TACAN and IFF	CSC	
44. Display international call sign when crossing the Line of Demarcation.	OOD	
<i>30 Minutes prior to mooring or anchoring</i>		
45. Station the quarterdeck watch	SUPPO	
46. Station line handlers	OOD	
<i>15 Minutes prior to mooring or anchoring</i>		
47. Embark pilot and display Code Hotel	OOD	
48. Prepare to receive tugs	OOD/ 1st LT	
49. If mooring to a buoy, lower boat when directed	OOD/ 1st LT	
50. Pass the word: "Fall in to quarters for entering port"	OOD	
<i>2 Minutes prior to mooring or anchoring</i>		
51. Pass to foc'sle and fantail: "Line handlers, stand by your lines"	OOD	

Event	COG	Initials
Moored or Anchored		
52. If anchoring, Navigation Evaluator determine and declare anchored/anchor holding	NAV	
53. Pass the word: "Moored/anchored"	BMOW	
54. "Secure the Restricted Maneuvering Doctrine"	OOD	
55. Pass the word: "Secure the Navigation Detail. Station the Inport/Anchor watch (as applicable.)"	OOD	
56. Shift to inport disk packs (Ships with SPY-1D)	CSOOW	
57. Rig accommodation ladder/brow/boats, as required	OOD	
58. Transmit arrival MOVREP	OPS	
59. Turn over Bridge CMS to CICWS/CDCWS for transfer to CMS Custodian	NAV	
60. Conduct final inventory, lock safe and sign SF702	NAV	
60. CICWS turn in Bridge/CIC/MCC CMS to CMS Custodian	CICWS	
61. Secure steering units	OOD/ EOOW	
62. Secure main engines (CO permission required)	OOD/ EOOW	
63. Pass the word: "Secure the Sea and Anchor Detail. Secure the Restricted Maneuvering Detail"	OOD	
64. Pass the word: "The Officer of the Deck is shifting the watch from the Bridge to the Quarterdeck." (Send deck log, ship's bell, transfer control of 1MC to quarterdeck)	OOD	
65. Shift all applicable alarms and external phone lines to the Quarterdeck	CSOOW	
65. Deliver completed checklist to Navigator for review and log completion in Ship's Deck Log	QMOW	

 Navigator Signature

 Date

Exhibit C-2 Sample Entering Port/Restricted Waters Checklist

Low Visibility Checklist

Event	COG	Initials
1. Log commencement of Low Visibility Checklist and reason		
2. Slow to a safe speed and ensure primary plot has established the ship's position		
3. Station the low visibility detail		
4. Order, "SET MATERIAL CONDITION ZEBRA MAIN DECK AND BELOW" (CO's discretion)		
5. Energize navigation lights in BRIGHT		
6. Order, "SILENCE ON THE BRIDGE"		
7. Sound fog signals according to inland/ international rules of the road per USCG Navigation Rules and Regulations Handbook		
8. Shift radio circuits to CIC		
9. Check settings on bridge-to-bridge radio		
10. The Commanding Officer will determine which plot is to be designated as primary, but the bridge will plot by GPS; CIC will retain a RADAR plot with GPS back up (if available)		
11. Open bridge wing doors (if applicable)		
12. If at trail shaft, order split plant (if applicable)		
13. Log completion of checklist in the ship's Deck Log		

Exhibit C-3 Sample Low Visibility Checklist

Mine Countermeasures/Swept Channel Checklist

Event	COG	Initials
<i>24 Hours Prior to Entering Mine Danger Area</i>		
1. Log commencement of Swept Channel Checklist	OOD	
2. Consolidate mine threat intelligence (floating/bottom/influence/magnetic/acoustic)	ISC/OPS	
3. Determine transit route and time (consider tides, currents, and depths)	NAV/CICO	
4. Conduct brief (concurrent with NAV brief)	NAV	
5. Review/verify Quiet Ship Bill	ENG/ASWO	
6. Verify degaussing is operational	ELECROO	
7. Secure cathodic protection	ELECTRO/EMO	
<i>1 Hour Prior to Entering Mine Danger Area</i>		
8. Conduct noise survey per EOSS MLOC	ENG	
9. Ensure all personnel possess inflatable life preservers	1ST LT	
10. Set Quiet Ship Condition Q1 or Q2 (at CO's discretion)	OOD	
11. Every 15 minutes, pass word: "The ship will enter a mine danger area in ___ minutes"	OOD	
12. Pass word: "Secure all missile hazards throughout the ship"	OOD	
13. Brief mine watch personnel and then station the detail	CICWO	
14. Set modified material condition ZEBRA main deck and below	CICWO	
<i>30 Minutes Prior to Entering Mine Danger Area</i>		
15. Prepare mine reports	CICWO	
16. Ensure prairie/masker air is energized (If ship's speed is greater than 5 knots) if equipped	EOOW	
17. Display lights/day shapes for ship restricted in ability to maneuver	OOD	
18. Man repair lockers	DCA	
19. All topside personnel don life preservers and helmets	OOD	
20. Station anchor detail (if applicable)	OOD	
21. Station leadsman (if applicable)	OOD	
<i>10 Minutes Prior to Entering Mine Danger Area</i>		
22. Secure fathometer	OOD/ASWO	
23. Pass word: "The ship will enter a mine danger area in ten minutes. All personnel not on watch remain inside the skin of the ship. All non-essential personnel lay to the second deck or above"	OOD	
24. Make the anchor ready for letting go (if applicable)	1ST LT	
25. Shift DRT/DDRT/CADRT trace to 1000 yard scale	CICWO	
<i>In Mine Danger Area</i>		
26. Transit at slowest possible speed (7 kts or less if not swept)	OOD	

Event	COG	Initials
27. Pass word: "The ship has entered a mine danger area. All personnel not on watch remain inside the skin of the ship. All non-essential personnel lay to the second deck or above"	OOD	
28. Log completion of checklist in the ship's Deck Log	OOD	

Exhibit C-4 Sample Mine Countermeasures/Swept Channel Checklist

QMOW Turnover Checklist	
Inventory	Intentions
Night Orders	DR Course/Speed
Navigation Bill	Fix Interval
QMOW Pass Down Log	PIM Track Course
Bearing Book	PIM Track Speed
Position Log	Track Left/Right
Nautical Almanac	Track Ahead/Behind
Magnetic Compass Book	Next Turn Point/Time
Navigation Workbook	Set/Drift
Navigation Rules	CIC/CDC Fix Comparison
Chart 1 Publication	Expected Aids/Landfall
Voyage Planning Worksheet	Ships in Company:
Deck Log/Extra sheets	Steaming Formation/Formation Guide
Position Report/Extra sheets	ECDIS-N Ships
Weather Observation Log/Extra sheets	Check feature/ Profile settings
8/12/20 O'clock Reports	Verify "Safety Config" settings
Emergency Navigation Laptop	
Celestial Computations	Senior QM Remarks
Sunrise	
Sunset	
Moonrise	
Moonset	
Azimuth	
Amplitude	
Weather	Navigator Remarks
Air Temperature	
Sea Temperature	
Heavy Weather Messages Plotted	
Last Fax/Next Fax	
Winds	
Currents	
Visibility	

Exhibit C-5 Sample QMOW Turnover Checklist

VOYAGE PLANNING/PILOTING PREPARATION CHECKLIST			
<i>NOTE: PREPARE SEPARATE PILOTING CHECKLISTS FOR BRIDGE AND COMBAT INFORMATION CENTER (CIC)</i>			
PORT/POSITION: _____		ETD/ETA: _____	
1. Planning Publications (Sailing Directions, Coast Pilot, Fleet Guides, as applicable)			
Pub Title	Corrected to NTM	Developer	Independent Review
Sailing Directions: - Recommended routes - Local regulations - Potential hazards			
Port Information: -Local conditions -Berth information			
2. Create Chart Portfolio (utilizing NAVBILL naming convention: _____) and Apply VDUs (See Appendix E). Select libraries for piloting, at a minimum must include Harbor, Approach, Coastal, and General library while in restricted waters. Verify current edition and convert to SDNC format. Apply latest VDU patch. Load TOD, as applicable. Chart Numbers/NTM Numbers will be used by non-ECDIS-N certified ships only.			
DNC Library/Chart Number	VDU Applied/NTM Number	Developer	Independent Rev.
3. Verify Local Notice to Mariners, NAVAREA, HYDROLANT/PAC/ARC and Coastal Warnings. Attach applicable items to checklist.			
Action	Developer	Independent Review	
Local Notice to Mariners: ____/____			
NAVAREA: ____/____			
HYDROLANT/PAC/ARC: ____/____			
Coastal Warnings (NAVTEX) – inside 200 nm from land, in waters outside NAVAREAs IV and XII (RECOMMENDED)			
4. Mariner Object/Layer Portfolio/Chart Preparation.			
Action	Developer	Independent Review	
For ECDIS-N Certified Ships:			

<ul style="list-style-type: none"> - Select Visual NAVAIDS and create layer “[PORT] VISUAL” - Select RADAR NAVAIDS and create layer “[PORT NAME] RADAR” - Select Composite NAVAIDS and create layer “[PORT NAME] COMPOSITE” - Create Layer Portfolio “[PORT NAME] NAVAIDS” 		
<p>For Non-ECDIS-N Certified Ships:</p> <ul style="list-style-type: none"> - Highlight shoal water in blue - Select and Label Visual NAVAIDS. - Select and Label RADAR NAVAIDS - Select and Label Composite NAVAIDS - Ensure sound and light characteristics are labeled for each NAVAID 		
<p>Create Gazetteer and attach to checklist and bearing book.</p>		
<p>4. Plot Track or Create Voyage Plan utilizing NAVBILL naming convention. Voyage Plan: _____</p>		
<p>Action</p>	<p>Developer</p>	<p>Independent Review</p>
<p>Add waypoints annotating the following:</p>		
<ul style="list-style-type: none"> - Turn Bearings/Ranges - ETD/ETA - Standard Rudder - Rhumb Lines - Planned Speed - Maximum/Minimum speed - Cross Track Error Limits 		
<p>Additional Non-ECDIS-N actions:</p> <ul style="list-style-type: none"> - Label Distance of each leg - Construct Slide Bar - Construct and Label turn range arc in yards - Construct and Label turn bearing - Annotate range to turn - Label Bridge and CIC chart shift points w/ next chart number (stagger by a minimum of at least one fix interval). - Annotate PIM in 4 hour increments 		
<p>Add critical points where specific actions may be required. Examples include but are not limited to: tug, pilot pick up/drop off, blind bend signal, speed limit changes, pit sword raised and lowered, TSS/VTSS, increased traffic, etc.</p>		
<p>Validate Track/Voyage Plan and check dangers.</p>		

5. Plot (or Create precision anchorage in anchoring sub-menu) if required.		
Action	Developer	Independent Review
Enter Position of anchorage at final waypoint.		
Enter head bearing based on known obstacles, winds, currents, and available bearing points.		
Enter inner and outer interval values (ECDIS-N only).		
Annotate range to anchor arcs (Non-ECDIS-N only).		
Calculate expected required scope of anchor chain using anchoring nomograph from ship's information book and predicted winds and currents.		
6. TSS/VTSS		
Action		Initial
Verify requirements and other considerations when navigating through TSS/VTSS.		
Verify VHF procedures, required calling in points and pilot boarding areas.		
7. Navigation Brief requirements (per Appendix B)		
Action		Initial
Ensure all navigators present.		
Verify all required attendees attend.		
Primary navigation aid determined and secondary means discussed.		
Anticipated traffic discussed		
Charted plan discussed		
Watch condition determined		
Conditions for increasing watch condition determined		
Any defective equipment made known to all team members		
8. Equipment Operability		
Action		Initial
Verify Gyrocompass and repeaters have less than one degree error.		
Verify GPS has FOM 2 or less.		
Verify Surface RADAR used for Navigation and repeaters are functional.		
Verify ECDIS-N is fully functional at one node, and one functional display on		

the bridge.			
Verify Fathometer is functional with at least one functional display on Bridge (depth display through ECDIS-N or other situational awareness system is acceptable).			
Verify Digital Fluxgate (DFGMC) or Navy standard Magnetic Compass is fully functional and calibrated prior to entering port on previous underway.			
Verify fusion plot (VMS/AIS/RADAR) settings are per NAVSEA/ISEA advisory messages.			
Verify ENL is operational for plan approval.			
Verify AIS is functioning and settings are per numbered fleet commander guidance.			
9. Create NAV Plan utilizing NAVBILL naming convention. NAV Plan: _____			
Action: Review Plan.			
Action	Senior QM	Navigator	Executive Officer
Review Layer Portfolio. date			
Review Chart Portfolio. date			
Review Voyage Plan. date			
Review NAV Plan. date			
8. Approve Plan.			
Portfolios Voyage Plan, and NAV Plan Approved. _____			
Commanding Officer (signature and date)			

Exhibit C-6 Sample Voyage Planning/Piloting Preparation Checklist

Loss of Sensors/Display Checklist

Loss of Display	COG	Initials
Loss of primary display shift to secondary per NAVBILL	QMOW	
Loss of secondary display shift to tertiary per NAVBILL	QMOW	
All three fail shift primary plot from the bridge to CIC	QMOW	
Loss of power to all nodes. System will automatically shift to UPS battery backup. Notify OOD and follow CSOSS procedures.	QMOW/ET	
Loss of Position Sensor – Restricted/Coastal waters		
Shift primary GPS sensor to secondary GPS Sensor per NAVBILL	QMOW	
Shift selected position sensor to approved hand held device per NAVDORM and manually enter into VMS.	NAV/QMOW	
Shift GPS Sensor to visual/RADAR. Manually enter.	NAV/QMOW	
Loss of Position Sensor – Open Ocean		
Shift primary GPS sensor to secondary GPS Sensor per NAVBILL	QMOW	
Shift selected position sensor to approved hand held device per NAVDORM and manually enter into VMS.	QMOW	
Shift selected position sensor to INS1	NAV/QMOW	
Shift INS1 to INS2	NAV/QMOW	
Loss of COG/Heading		
Shift primary sensor To Secondary sensor per NAVBILL	QMOW	
Shift from Secondary sensor to tertiary sensor per NAVBILL	QMOW	
Shift from tertiary sensor to DFGMC per NAVBILL or manually enter DFGMC heading into VMS	NAV/QMOW	
Loss of SOG/STW sensor		
Shift primary sensor to dummy log	ET	
Shift to manual	QMOW	
Loss of Time		
Select a secondary time source if available. (Not to be accomplished during maneuvering events)	ET/NAV/QMOW	
Loss of Set/Drift		
Input last known good set/drift value as manual data and change selected set/drift sensor to manual	QMOW	
Loss of Depth		
Shift Primary to secondary (if applicable)	QMOW	
Shift to manual	QMOW	

Exhibit C-7 Sample Loss of Sensors/Display Checklist

Anchoring Checklist

Ship: _____

Date: _____

From: _____

To: _____

Event	COG	Initials
<i>24 Hours Prior to Anchoring</i>		
1. Log the commencement of anchoring checklist in the Deck Log	OOD	
2. Verify correct anchorage plotted in VMS and the approved plan is loaded	NAV	
3. Verify all VMS nodes display setting per NAVBILL.	QMOW	
4. Review RADAR radiation restrictions for the local area; brief at Anchoring Brief.	FCO	
5. Conduct Anchoring Brief	NAV	
6. Review ship's Anchoring Nomograph	NAV/ 1 st LT	
7. Conduct Intentional Auto-Compensation of DFGMC. Log completion in deck log.	OOD	
8. Determine gyro and repeater error and post on all repeaters. Log in the deck log and magnetic compass log.	NAV	
9. Ensure tides and current information is posted or available on the bridge.	NAV	
10. Radar range determined and posted on repeaters.	CICO	
11. Provide 1 st LT with bottom type and depth of water	NAV	
12. Conduct steering checks. Log completion in deck log.	OOD	
13. Notify EOOW when ship is approaching 3 nm from land to secure CHT	OOD	
14. Ensure VHF bridge to bridge radio is operational.	OOD	
<i>1.5 Hours Prior to Anchoring</i>		
14. Test ship's whistle. (CO permission required) (Ensure no personnel aloft).	OOD	
15. Pass the word. "Make all preparations for anchorage. The ship expects to anchor in the vicinity of _____ (location) at _____ (time)."	OOD	
<i>1 Hour Prior to Anchoring</i>		
16. Prior to approaching land/shoal to within 5 nm, station the modified Navigation Detail. Ensure the detail is manned and ready at the 5 nm point.	OOD	
17. Prior to entering restricted waters, station and pass the word. "Station the Sea and Anchor Detail." (CO permission)	OOD	
18. Check the setting of material condition _____. Pass the word: "Check the setting of material condition Yoke; make reports to CCS"	OOD/DCA	
19. DC Central report when material condition _____ is set/checked.	CCS/ENG	

Event	COG	Initials
20. Conduct time check on 1MC	OOD	
21. Test and log VHF BTB communications	TACCOM	
22. Establish comms both with 1JV (primary) and hand-held radio (secondary) with the foc'sle	OOD	
23. Verify fathometer operation and settings	NAV	
24. Deliver Draft Report to OOD	DCA	
25. Receive all manned and ready reports	OOD	
26. Make both port and starboard anchors ready for letting go and make _____ anchor, ready anchor (CO permission).	OOD/ FOC'SLE	
27. Trip housing stoppers. Ensure both wildcats are disengaged and slack is in the riding stoppers. Reports, "Port and Starboard anchors are ready for letting go, _____ anchor is ready anchor."	FOC'SLE	
<i>30 Minutes Prior to Anchoring</i>		
28. if anchorage is within 3 nm of land, order EOOW to shift CHT system to transit mode.	OOD	
29. Compute and report the following to all stations: a. True wind _____ b. Set/drift _____ c. Water depth at anchorage _____ d. Type of bottom at anchorage _____	NAV	
30. Raise the jack staff.	FOC'SLE	
31. Provide tide and current information	NAV	
32. When all requirements and conditions are met to enter restricted waters, report "Ship manned and ready for entering restricted waters" to the Commanding Officer (Deck log entry required)	XO	
<i>Upon Entering Restricted Waters</i>		
33. Place Restricted Maneuvering Doctrine in effect (CO permission required). If permission granted, pass the word: "Restricted Maneuvering Doctrine is in effect"	OOD	
34. Conform to local RADAR radiation restrictions	CSC	
35. Display international call sign when crossing the Line of Demarcation.	OOD	
<i>Approaching Anchorage</i>		
36. Recalculate True Winds. TRUE WINDS _____.	OOD/ NAV	
37. Three-minute fixes for the initial approach.	OOD	
38. Slow to 10 kts when steady on head bearing .	OOD	
39. At 2,000 yds from anchorage, order "All ahead 1/3".	OOD	
40. One-minute fixes at 2,000 yds.	OOD	
41. Shift to constants at 1,000 yds.	OOD	
42. At 600 yds to anchorage, order "All stop".	OOD	

Event	COG	Initials
43. At 500 yds order foc'sle to "Stand by your anchor.". Trip the riding stopper on ready anchor and stand by. Verify required anchor scope with chartered depth.	OOD	
44. At 350 yds from anchorage, order "All back 2/3".	OOD	
45. With slight sternway and over the anchor point, order "Let go the anchor" with CO's concurrence.	OOD	
<i>Upon Anchoring</i>		
46. Recalculate true winds. TRUE WINDS _____.	OOD	
47. Pass the word: "Anchored." Pass "Shift Colors" (if required).	OOD	
48. When anchor is let go, plot a fix on VMS.	QMOW	
49. Plot the drag circle (distance from pelorus to hawespipe plus length of the ship) and swing circle (scope of chain plus length of ship) in VMS.	QMOW	
50. Plot a fix every three minutes for the first 30 minutes to ensure ship's position is accurate.	QMOW	
51. For the next 30 minutes, take 5-minute fixes for winds and to ensure ship remains within drag circle.	QMOW	
52. If ship remains within drag circle, fixes will be taken every 15 minutes.	QMOW	
53. Foc'sle reports the status of the anchor chain as follows: "_____ fathoms at _____, anchor chain tends _____ o'clock, _____ strain or up and down."	FOC'SLE	
54. Foc'sle continue to pay out chain until the shot, brake is set and held. Make report to bridge, "Anchor appears to be holding, request permission to veer desired scope."	FOC'SLE	
55. Foc'sle release brake, veer to _____ on deck, set brake and "Request permission to pass stoppers."	FOC'SLE	
56. When stoppers passed, report to the OOD "Anchor watch set."	FOC'SLE	
57. Ensure deck log entry is made to include time of anchorage, depth of water, which anchor is used, (port/centerline), scope of chain used, bottom type, ship's head and anchor bearings.	OOD	
58. Pass the word. "Secure the Restricted Maneuvering Doctrine" (CO permission).	OOD	
59. Pass the word: "Secure the Navigation Detail. Station the Anchor watch."	OOD	
60. Rig accommodation ladder/brow/boats, as required.	OOD	
61. Pass the word: "Secure the Sea and Anchor Detail.	OOD	
62. Pass the word: "The Officer of the Deck is shifting the watch from the Pilothouse to the Quarterdeck." (Send deck log, ship's bell, transfer control of IMC to quarterdeck)	OOD	
63. Shift all applicable alarms and external phone lines to the Quarterdeck	CSOOW	
64. Transmit arrival MOVREP	OPS	
65. Deliver completed checklist to Navigator for review and log completion in Ship's Deck Log	QMOW	

Event	COG	Initials
_____ Navigator's Signature	_____ Date	

Exhibit C-8 Sample Anchoring Checklist

APPENDIX D
SHIP'S POSITION REPORT (NAVSHIP 9240/1)

1. Purpose. To provide a means of reporting the ship's position if required by the Commanding Officer.
2. Format. Required information:
 - a. Time of day - 0800, 1200, or 2000
 - b. Date - current date
 - c. Latitude/Longitude - DR LAT/LONG at 0800, 1200, or 2000
 - d. Determined at - the time of the fix from which the position was obtained
 - e. By – select Celestial, DR, GPS, RADAR, or Visual (May pen and ink form to annotate GPS (PPS))
 - f. Set and Drift
 - g. Distance made good since (Time/Miles) - the distance traveled since the last report, always computed from position report to position report
 - h. Distance to - always to the ultimate destination
 - i. ETA - the estimated time of arrival at the ultimate destination, expressed as a date/time group
 - j. True heading - the heading of the ship corrected from gyro error
 - k. Error - the gyro error previously computed
 - l. Variation - the angular difference between the true North Pole and the magnetic north pole, as determined from the chart compass rose
 - m. Magnetic Compass Heading – select STD, STEERING, REMOTE IND, DFGMC or OTHER
 - n. Deviation
 - o. Table deviation - the deviation from Form 1104 that was predetermined for the magnetic compass
 - p. Degaussing (DG) - status of degaussing, on or off
 - q. Remarks – GPS Figure of Merit (FOM) values and additional information from the Navigator to the CO
 - r. Respectfully submitted by (Navigator/ANAV/Senior QM) - signature. CC - Carbon Copy to embarked staff, CIC, and (1) to file
3. Responsibility for submission. The QMOW/PLOT watch will fill out and submit the position report to the ANAV/Senior QM.

4. Responsibility for review and approval. The Navigator is responsible for position reports. The Navigator will approve them by signature before submission to the CO, embarked staff, and CIC.

5. Retention. If required by the CO, the Ship's Position Report, an e-mail or electronic report, will be kept by the Navigator as may be convenient, but will not normally be kept beyond the end of the month or duration of the voyage, whichever is greater.

APPENDIX E
 CHARTS AND PUBLICATIONS

Paper Chart Product	Electronic Product	Class/ Caveat
Nautical Charts	DNC	LIMDIS
Notice to Mariners	VDU	LIMDIS
OPAREA, Range, and Exercise charts	TOD 0	LIMDIS/Secret
Bottom Contour (BC)	TOD 2	Conf
Bathymetric Nav Planning Charts (BNPC)	TOD 2	Secret
Combat Chart/Littoral Planning Chart	None	Secret
Other Charts	Various	Conf/Secret/TS

Table E-1 Paper and Electronic Chart Products Class and Caveat

1. The distribution of DNC is authorized to U.S. Department of Defense and their contractors. DNC updated by the Vector Product Format (VPF) Database Update (VDU) is authorized for navigation on certified systems such as the Electronic Chart Display and Information System-Navy (ECDIS-N) or comparable systems (33 CFR 164.01).
2. The DNC is an unclassified vector-based digital geospatial intelligence database depicting significant features essential for safe marine navigation. DNC libraries are automatically distributed on CD-ROM for all 29 Regions and is also available over the NGA Gateway:
 - a. POC – mcddnc@nga.mil
 - b. NIPRNET: <https://msi.geo.nga.mil/NGAPortal/DNC.portal>
 - c. SIPRNET: <https://sps.stl.nga.smil.mil/products/dnc1/index.php>
 - d. JWICS: <http://www.geoint.nga.ic.gov/products/dnc1/>
3. VDU for DNC® are updated on a monthly cycle, with one quarter of the DNC libraries update each week. Weekly downloads of the new VDUs applicable to a ship’s operations will keep the DNC libraries up-to-date. VDU is posted on the NGA Maritime Safety Information (MSI) portals listed above alongside the DNC. Commands must understand how to properly apply VDU per guidance set forth in the applicable VMS Operators Manual in order to prevent system degradation. A CD-ROM with VDU for all 29 DNC regions is also distributed monthly by DLA.
4. Authorized users of DNC are required to immediately report any safety of navigation related discrepancy that may be detected on DNC to NGA's 24-hour NGA Maritime Safety Watch Desk via:
 - a. C2OIX message to NGA NAVSAFETY WASHINGTON DC
 - b. NIPRNET e-mail at navsafety@nga.mil
 - c. SIPRNET e-mail at navsafety@nga.smil.mil.
 - d. Phone: Comm 571-557-5455
 - e. 1-800-DMA-NAVY or DSN 547-5455.

5. In the report, the user must identify which electronic charting system/ECDIS-N, including the software version, is being used; the DNC library number; DNC CD edition number and a description of the discrepancy. Upon receipt of the report, NGA will take immediate action to determine if corrective action is necessary and, if so, will advise all users accordingly via the HYDROLANT, HYDROPAC and/or HYDROARC broadcast service.

6. Additional NGA e-mail addresses include:

- a. Advanced Geospatial Intelligence (AGI) - MCDAGI@nga.mil
- b. Bathymetric Navigation Planning Charts (BNPC) - MCDBNPC@nga.mil
- c. Chartlets - MCDChartlets@nga.mil
- d. Charts - MCDCharts@nga.mil
- e. Digital Nautical Charts (DNC) - MCDDNC@nga.mil
- f. Electronic Chart Display and Information System (ECDIS) -
- g. MCDECDIS@nga.mil
- h. Electronic Print-On-Demand - Maritime (EPODS-M) - MCDEPOD@nga.mil
- i. HarborView(TM)/Global Port Infrastructure Data (HV/GPID) - MCDHV@nga.mil
- j. Bathymetric Data (HYSAS program) - MCDHYSAS@nga.mil
- k. OPAREA data - MCDOPAREA@nga.mil
- l. Tactical Ocean Data (TOD) - MCDTOD@nga.mil

Paper Publication	Electronic Format	Class/Caveat
Notice to Mariners	.pdf	1 Unclass/1 Secret
Summary of Corrections	.pdf/db	5 Unclass/1 Secret
Chart 1: Nautical Chart Symbols and Abbreviations, United States of America	.pdf	Unclass
Chart 4: Symbols, Abbreviations, Terms used on Nautical Charts of Russia (BEING DELETED)	.pdf	Unclass/LIMDIS
Pub # 9: The American Practical Navigator (Bowditch)	.pdf	Unclass
Pub # 102: International Code of Signals	.pdf	Unclass
Pub #105 - 109: Atlas of Pilot Charts	.pdf	Unclass
Pub # 110 – 116: NGA List of Lights (6 Vols)	.pdf/db	Unclass
Pub # 117: Radio Navigation Aids	.pdf/db	Unclass
Pub # 120 - 200: Sailing Directions	.pdf	Unclass
Pub # 150: World Port Index	.pdf/db	Unclass

Paper Publication	Electronic Format	Class/Caveat
Pub # 151: Distance Between Ports	.pdf	Unclass
Pub # 229: Sight Reduction Tables for Marine Navigation (6 Vols)	.pdf	Unclass
Pub # 940: Fleet Guide (Atlantic)	.pdf	Unclass/LIMDIS
Pub # 941: Fleet Guide (Pacific)	.pdf	Unclass/LIMDIS
Pub # 1310: RADAR Navigation and Maneuvering Board Manual	.pdf	Unclass

Table E-2 Paper and Electronic Publication Products Class and Caveat

7. Foreign Chart Requests: See Chapter 3.k.(6). Points of contact are listed in Table E-3.

PACOM AOR:	REST OF WORLD:
Daniel G. Morris, COMPACFLT (N321) GI&S Officer NIPRNet: daniel.g.morris@navy.mil SIPRNet: daniel.morris@navy.smil.mil TEL: 808-474-6901 (STE) DSN: 315-474-6901 (STE) PLA: COMPACFLT PEARL HARBOR HI	Troy Tworek, COMUSFLTFORCOM (N373) Navigation/GI&S/METOC GFM and Oceanographic Survey Programs NIPRNet: troy.tworek@navy.mil SIPRNet: troy.tworek@navy.smil.mil TEL: 757-836-6837; DSN: 312-836-6837 PLA: COMUSFLTFORCOM NORFOLK VA

Table E-3 Foreign Charts Points of Contact

8. DLA Mapping Customer Operations (MCO). Map accounts are tied to a unit's DoD Activity Address Code (DODAAC). The MCO cannot create, modify or delete a DODAAC. Address all DODAAC requests to the Navy DODAAC Service POC at DNS: 312-580-5908 or commercial (216) 204-5908.

a. MCO Contact Information:

Defense Logistics Agency Aviation, Mapping Customer Operations (DSCR-QAM)
 8000 Jefferson Davis Highway
 Richmond, VA 23297-5339
 Commercial: 804-279-6500, Toll Free: 800-826-0342, DSN: 312-695-6500

b. MCO Website: <http://www.dla.mil/aviation/offers/products/mapping.aspx>. The MCO web site website includes a Customer Handbook, training for AMPS and MEBS and information on the Flight Information Publication (FLIP) production cycle and distribution. MCO Email contacts:

- (1) Customer Management: acctmgr@dlamail.mil
- (2) Product Management- Aeronautical: aero@dlamail.mil
- (3) Product Management - Digital: digital@dlamail.mil
- (4) Product Management - Hydrographic: hydro@dlamail.mil
- (5) Product Management - Topographic: topo@dlamail.mil

(6) SIPR: dla.richmond.aviation.mbx.rmfdscr@mail.smil.mil

c. MCO Related Links:

- (1) AMPS: <https://amps.dla.mil/>
- (2) MEBS: <https://mebs.dla.mil>
- (3) Map Shipment Tracking: <https://wegal.ogden.disa.mil/mrostatus/>
- (4) FEDMALL: <https://www.fedmall.mil>
- (5) WEBREQ: <https://www.transactionservices.dla.mil/daashome/>

d. Theater Map Support Offices. See Table E-4 below.

MSO	Commercial / DSN	E-Mail
Norfolk, VA	757-444-4243 / 564-4243	msonorfolk@dlamail.mil
San Diego, CA	619-545-6070 / 735-6070	msosd@dlamail.mil
Joint Base Pearl Harbor Hickam , HI	808-473-9580 / 315-473-9580	mso.hawaii@dlamail.mil
Yokosuka, Japan	011-81-468-16-3992 / 315-243-3992	mso.japan@dlamail.mil
Waegwan, Korea	011-82-54-970-4182 / 315-765-4182	ChongMin.Cho.kor@dlamail.mil
Germersheim, Germany	011-49-7274-96-5400 / 314-378-5447	dladisteurope@dlamail.mil
Manama, Bahrain	011-973-1785-3624 / 318-439-3624	mso.kuwait@dlamail.mil

Table E-4 Theater Map Support Offices Points of Contact

e. Crisis Ordering. MCO can assist with any emergency requests due to crisis situations, short-notice deployments or any other unexpected development. When requesting expedited map/chart shipments in support of emergency or contingency operations, contact the MCO initially by telephone at (804) 279-6500/DSN 695-6500 or 1-800-826-0342.

f. DODAAC Service Points for the Military. See Table E-5.

Service	DODAAC Service Point
Navy	DSN: 580-5908; Commercial: (216) 204-5908
Army	DSN: 645-8292; Commercial: (256) 955-8292 DSN: 645-9653; Commercial: (256) 955-9653 DSN: 645-0825; Commercial: (256) 955-0825 DSN: 645-9750; Commercial: (256) 955-9750
Air Force	DSN: 787-9812; Commercial: (937) 257-9812
Marines	DSN: 567-8027; Commercial: (877) 564-8762 DSN: 567-6845
Coast Guard	Commercial: (410) 762-6590

Table E-5 Mapping Customer Operations

10. NGA Remote Replication Services (RRS). RRS is a no-cost NGA custom-production field office, one of the greatest customer needs-based functions NGA offers. Even if you are on an ECDIS-N certified ship or craft, the RRS can develop products that suit your specific mission and needs. The RRS provides, print, scan, and digital Services. Shipping services can be arranged. Here are some examples of what the RRS can provide:

- a. Generate special Graphics
 - (1) Request reduced-sized chartlets, or blown up views for reference.
 - (2) Analytic products
 - (3) DNC chart data overlaid on Imagery
 - (4) Blank Test Charts
 - (5) Burial at Sea charts for the next of kin
- b. Add overlays and graphics on navigable charts
 - (1) Synthetic geography for training, to visualize foreign waters over familiar charts.
 - (2) Incorporate Photos, Boundaries, & Sector graphics into charts for real world operations
 - (3) Exercise or Operations-specific boundaries and features
- c. Digital Scans and Prints of Charts - approved for navigational use.
 - (1) Copy your charts so that the Bridge and CIC copies are exactly the same
 - (2) Request multiple copies to preserve your master copy

NOTE: RRS does NOT print standard products or laminate. Standard Products should be procured through DLA.

CONUS Remote Replication Service (RRS) Contact Info		
EAST COAST RRS Norfolk, VA	WEST COAST RRS Camp Pendleton, CA	PENTAGON Washington D.C.
Keith Robertson or Yarb Scott	Justin Hillier or Cpl Leland Kearns	John Esposito or MaryEllen Hughes
581 A Street, Bldg. SP-312, STE 110	Bldg. 1594 E Street	Mail Stop : 1F350
Norfolk, VA 23511	Camp Pendleton, CA 92055	Washington, D.C. 20310
757-444-0660	760-725-5502 DSN 312-365-5502	703-614-0411 703-693-7052
Keith.P.Robertson@nga.mil	WestCoast_RRS@usmc.mil	John.F.Esposito@nga.mil
Yarbrough.W.Scott@nga.mil	justin.hillier@usmc.mil	MaryEllen.C.Hughes@nga.mil

SOUTHCOM Miami, FL	CENTCOM / SOCOM MacDill AFB, FL	FORSCOM / JSOC Ft Bragg, NC
Don Myrick	Chris Morken	Jonathan Swiatkowski
9301 N.W. 33rd Street	Hanger Loop Dr., Bldg 7	4700 Knox St. Bldg. 8-1808
Doral, FL 33172	MacDill AFB, FL 33621	Ft Bragg, NC 28310
305-437-3227	813-529-2470 DSN 529-2470	910-570-5244 910-570-5249
Donald.Myrick@hq.southcom.mil	Christopher.j.morken.civ@mail.mil	jonathan.i.swiatkowski.civ@mail.mil
OCONUS Remote Replication Service (RRS) Contact Info		
PACOM Hickam AFB, HI	PACOM Okinawa, Japan	5 th Fleet / CENTCOM Manama, Bahrain
Dan Thornes	Edwin Rivera	Shannon Gorman or Masoui McBean
900 Hangar Ave, Bldg 2060, (Hangar 2 & 4)	Bldg. 2814 Anderson St.	NGA/NSA BANZ Bay 8
Hickam AFB(JBPHH), HI 96853	Camp Hansen, Okinawa, Japan 90422	Juffair Bahrain
808-448-2092 DSN 315-448-2092	011-81-611-723-4455 DSN 315-623-4455	011-973-178-53570 DSN 318-439-3570
HIRRS@us.af.mil	Edwin.M.Rivera@nga.mil	RRS_Bahrain@nga.mil
	Unit 35607 - FPO AP 96606-5607	FPO, AE 09834-2800
EUCOM Stuttgart, Germany	AFRICOM Stuttgart, Germany	
JT Trice (Turnover Summer 2018)	George Crandall	
Patch Barracks, Bldg 2315	Kelley Barracks, Plieninger Str. Geb #3306	
70569 Stuttgart, Germany	70567 Moehringen, Germany	
011-49-711-680-6200 DSN 314-430-6200	+49 711 729 3224 DSN 314-421-2362	
james.t.trice.civ@mail.mil	George.R.Crandall@nga.mil	
Unit 30400 - APO AE 09131	Unit 29951 - APO AE 09751-9951	

Table E-6 Remote Replication Service (RRS) Contact Information

APPENDIX F
NAVIGATION TRAINING RESOURCES

1. Safe and prudent navigation in practice is highly dependent upon an effective program of training for all navigation and ship control personnel. Lack of knowledge has been historically found to be a significant contributor to incidents at sea and can be mitigated by proactive learning at all levels of the command echelon and incorporating training at every opportunity available.
2. Immediate Superiors in Command (i.e., Squadron or Group Staffs) are encouraged not only to assess Navigation Team performance on their ships but also to test requisite knowledge of all Navigation Team and ship handling personnel during every phase of the ship's life cycle. Topics include but are not limited to Rules of the Road per reference (e), Piloting Procedures, GPS and INS Capabilities and Limitations, Basic Hydrography and Charting, Operational Risk Management, radar use and optimization, use of AIS, fusion displays, and Case Study Analysis.
3. The following resources are available to assist the Navigation Team.
 - a. U.S. Naval Observatory: <https://aa.usno.navy.mil/DoD/>. The Astronomical Applications Department of the U.S. Naval Observatory's products - almanacs, software, and web services - provide precise astronomical data for practical applications, serving the defense, scientific, commercial, and civilian communities.
 - b. COMNAVSURFPAC (<https://cpf.navy.deps.mil/sites/cnsp/Readiness/SitePages/Home.aspx>) and COMNAVSURFLANT (<https://usff.navy.deps.mil/sites/surflant/default.aspx>) Lessons Learned/Near Miss Databases. For CNSF, email to CNSPsafety@navy.mil and refer to references (p) and (q) for more information.
 - c. Navy Lessons Learned-Navy Warfare Development Command (NWDC). The Navy Lessons Learned Program is the process by which the Navy collects and disseminates all Observations and Recommendations and Port Visit Reports (PVRs) from Joint and Maritime Operations. This feedback includes observations that may identify problems, issues, or requirements, and, if known, suggested corrections to these deficiencies. Observations may also contain pertinent information concerning doctrine, tactics, techniques, procedures, systems, or may simply address a general document or process. See the following web sites:
 - (1) SIPR: <http://www.jllis.smil.mil/navy>.
 - (2) NIPR: <https://www.jllis.mil/navy> (CAC required and users must register and establish an account in order to view NLL records).
 - (3) NWDC Lessons Learned Portal: <https://portal.nwdc.navy.mil/Ops/default.aspx> (CAC required).
 - d. USCG Navigation Training <http://www.navcen.uscg.gov/>.
 - e. DOD GPS Operations Center: <https://gps.afspc.af.mil/GPS/>.
4. Contact Information.
 - a. Navy Lessons Learned (Unclassified: NIPRnet): nwdcnavylessons@nwdc.navy.mil.

- b. Navy Lessons Learned (Classified: SIPRnet): navylessons@nwdc.navy.smil.mil.
- c. National Geospatial-Intelligence Agency (NGA) <http://msi.nga.mil/NGAPortal/MSI.portal> or <http://msi.nga.mil/NGAPortal/DNC.portal>.

APPENDIX G
DEFINITIONS

1. Definitions

- a. AIAS. Aircraft Inertial Alignment System.
- b. AIS. Automatic Identification System.
- c. Assault Draft. The navigational draft of an amphibious ship once pre-ballasted in preparation for amphibious operations.
- d. Ballast Draft. The navigational draft of an amphibious ship after achieving the final desired depth at the sill for amphibious operations.
- e. Chart Data Layer. A Mariner Object can be saved to the chart data for a specific electronic chart library. Objects saved to the chart data layer are known as Chart Additions. Mariner Objects saved as Chart Additions are displayed ONLY with the chart to which they were saved; they are not displayed with any other chart, even when the coverage area of that chart includes the position of the object.
- f. Combat Information Center (CIC). When used in reference to the Bridge, a generalized term that includes CDC, TOP, ICC, MCC, SMC, etc., depending on ship platform.
- g. Datum. Any numerical or geometrical quantity or set of such quantities which may serve as reference or base for other quantities. In navigation two types of datums are used: horizontal and vertical.
- h. DDRT/CADRT. Digital Dead Reckoning Tracer/ Computer Assisted Dead Reckoning Tracer.
- i. DHSL/DHYSL. Digital Hybrid Speed Log. A self-contained, two-axis velocity measurement system.
- j. Display Layer. A VMS Data Layer. When a Mariner Object is saved to an operator-defined display layer, the object is linked to its designated location, and not to a specific chart. The object can be displayed with any electronic chart whose coverage area includes the object's location; however, display of the object depends upon activation of the layer portfolio which contains the display layer to which the object was saved.
- k. Digital Nautical Chart (DNC). An Electronic Navigational Chart (ENC) produced by the NGA, in the Vector Product Format (VPF), for use by the U.S. government, including the DoD. DNC databases are partitioned into Harbor, Approach, coastal, and General libraries based upon the scale of the source chart and are certified "safe for navigation" by NGA. Tactical Ocean Data (TOD) provides additional layers of data (e.g. OPAREAs) for navy-specific requirements.
- l. Electronic Navigational Chart (ENC). An electronic navigational chart or ENC is an official database created by a national hydrographic office for use with an Electronic Chart Display and Information System (ECDIS). ENC consists of digitized data conforming to the International Hydrographic Organization (IHO) ENC S-57 exchange standard for digital hydrographic data. The basic unit of geographic coverage (analogous to a paper chart) is termed a cell. An ECDIS will convert the ENC and its updates into a System ENC (SENC) in an internal format optimized for efficient display. ENCs are considered official vector-based electronic charts designed to meet the relevant chart carriage requirements of the Safety of Life at Sea (SOLAS) convention. When displayed within certain

parameters, and using a type approved ECDIS, ENC's fully satisfy SOLAS chart carriage requirements, and so can be used as the primary means of navigation.

m. Estimated Position. The most probable position of a craft determined from incomplete data or data of questionable accuracy. Such a position might be determined by applying a correction to the dead reckoning position, as for estimated current; by plotting a line of soundings; or by plotting lines of position of questionable accuracy. If no better information is available, a dead reckoning position is an estimated position, but the expression *estimated position* is not customarily used in this case. The distinction between an estimated position and a fix or running fix is a matter of judgment.

n. Estimated Position Error (EPE). The metric or Imperial values that correspond to a specific GPS FOM, i.e., FOM 1 has EPE values of 25m, 82ft, and 27.3yds.

o. Event Mark. The Event Mark function allows the operator to mark and describe events that occur during a voyage. When an Event Mark is set, the time of the event is immediately recorded to a log file on the hard drive of the VMS workstation in units of UTC(USNO). If Own Ship History option is turned on in the Main Features window, a time-stamped event mark is placed on the chart display at the present Own ship position.

p. Fix. A position determined without reference to any former position. The common intersection of three or more lines of position, and/or three or more RADAR ranges obtained from simultaneous observations. A GPS fix is the latitude and longitude provided by the installed equipment derived from timing signals received from GPS satellites "in view of" (or "available to") the receiver-antenna. A composite fix uses multiple sources (i.e., visual and RADAR LOPs) rather than a homogenous source (only visual LOPs) to develop a fix position.

q. High Density Shipping Area/High Density Traffic Waters. Also referred to as "congested waters," means an area of water where, due to presence of many vessels in the vicinity, a repeated risk of collision exists and it may be difficult for vessels to maintain course. It is an area of water where the situation repeatedly arises in which a vessel is likely to collide with another vessel and an action to avoid a collision is limited by the existence of a third vessel or fixed structure, or where such situation is expected to arise. The following areas are suggested to be considered as congested waters:

- (1) The Japan Coast, including Osumi Kaikyo & Tsugaru Kaikyo.
- (2) Taiwan Strait.
- (3) Singapore Straits (including 20nm NE of Horsburgh) and Malacca Straits (including 20nm NW of One Fathom Bank).
- (4) Strait of Bab-El-Mandeb.
- (5) Gulf of Suez (Including Strait of Gubal).
- (6) Gibraltar Strait (including 20 nm either side of Europa Point).
- (7) The English Channel (including TSS off Ushant).
- (8) Dover Strait.

(9) Maas Approach.

(10) TSS off Texel & Vlieland.

(11) Strait of Hormuz.

(12) Areas of heavy fishing traffic (e.g., East Coast of China).

(13) Any other area where heavy traffic is encountered.

r. IBS/IBNS. Integrated Bridge System/Integrated Bridge Navigation System. The full-control (rudders and engines) ECDIS-N suite installed on various ship classes.

s. IHO S-57. The International Hydrographic Organization (IHO) Standard for Digital Hydrographic Data. Although originally developed as a standard for the transfer of digital hydrographic data between national hydrographic offices, it has become the accepted format for the ENC database used in ECDIS. ENC produced by NOAA are issued in the IHO S-57 format.

t. IHO S-100. Refers to a series of standards being developed by the IHO that will define the ENC of the future. The current estimated release date for the S-100 standard is 2020. Once finalized, national hydrographic offices including NOAA and NGA will begin production of ENC in the S-100 format for use in ECDIS.

u. Mariner Object. Operator-entered information often concerning known dangers, operating areas, navigational aids, or other data related to specific chart locations, displayed along with the basic chart data. This added information can be organized into visual layers, which are turned on and off as needed through the use of a layer portfolio. Each Mariner Object is categorized by object type and by sub-type.

v. Moriah. A combined wind, meteorological, and oceanographic measuring and indicating system.

w. Navigational Draft: The deepest depth drawn by a ship at any particular time. The Navigational Draft will differ significantly between vessels depending on both the class of vessel and type of operations being conducted. Ballast operations, movement of liquid loads, and shallow water effects will alter a ship's navigational draft.

x. No Fix. No Fix is when you do not have information that meets the criteria for a Fix, an Estimated Position, or a Running Fix.

y. Running Fix. A position determined by crossing lines of position obtained at different times and advanced or retired to a common time. However, in celestial navigation or when using long-range electronic aids, a position determined by crossing lines of position obtained within a few minutes is considered a FIX; the expression RUNNING FIX is applied to a position determined by advancing or retiring a line over a considerable period of time. There is no sharp dividing line between a fix and a running fix in this case.

z. Safe for Navigation Report. For every course or speed change, the Navigation Evaluator, Piloting Officer and Shipping Officer must provide a report as to whether the new course is safe from hazards to navigation and for what distance it is deemed safe.

aa. Safety Depth. The ship's navigational draft + safety factor. This safety factor should be established by the CO. The units should be in feet, fathoms, or meters.

ab. Shoal Water. Water that is shallower than the ship's navigation draft + CO's Safety Factor.

ac. System Digital Nautical Chart (SDNC). SDNC is the database resulting from the direct read of VPF products by the ECDIS-N for appropriate use, updates to DNC and TOD via VDU, and other data added by the operator. It is the database that is actually accessed by ECDIS-N for the display generation and other navigational functions, and is the equivalent to an up-to-date paper chart. The SDNC may also contain information from other sources.

ad. System Electronic Navigational Chart (SENC). Many commercial ECDIS convert from the original format (e.g. S-57) into a proprietary format known as SENC, designed to run more efficiently on the ECDIS. Some commercial companies (e.g. C-Map) provide SENC databases to their ECDIS customers in lieu of ENC in the S-57 format.

ae. S-IBS. Scalable Integrated Bridge System. The rudder-control only ECDIS-N suite installed on various ship classes.

af. Steaming Draft: The navigational draft of an amphibious ship after de-ballasting; returning the ship to the most desirable list, trim, and draft for transiting.

ag. Tactical Layer. A special display layer which is always active for display and safety-checking, without regard to the selected electronic chart or layer portfolio. Mariner Objects saved to the Tactical layer are always available for display, independent of the displayed chart or of any selected layer or layer portfolio. When Mariner Objects are added to the Tactical layer, the objects are available for immediate use, without requiring modification of a stored display layer or a layer portfolio. Display of the Tactical layer can be turned on and off.

ah. UTC (USNO). Coordinated Universal Time as maintained by the U.S. Naval Observatory, the standard for military systems. It is received using GPS(PPS), Network Time Protocol (NTP) servers, or by voice announcer.

APPENDIX H
 VMS 7.X/8.X DISPLAY FEATURES

1. Utilize the table below to configure the display features in VMS 7.X/8.X. Per Chapter 1, the operator may be required to utilize ENC libraries. Refer to JA26-8631 Voyage Management System Operators Manual Military Software Version 7.7I and 59560-D9-MMC-010 Voyage Management System Operators Manual Military Software Version 8.3.

Display Features	Ocean	Coastal	Piloting	Restricted
Anchor Drag				
Drag Circle	ON/OFF	ON/OFF	ON	ON
Swing Circle	ON/OFF	ON/OFF	ON	ON
Anchoring				
Anchorage	ON/OFF	ON/OFF	ON	ON
Head Bearing Line	ON/OFF	ON/OFF	ON	ON
Guard Ring	ON/OFF	ON/OFF	ON	ON
LOP Draw				
Fix	ON	ON	ON	ON
Fix History	ON	ON	ON	ON
Dead Reckoning	ON	ON	ON	ON
Temp Nav Points	ON	ON	ON	ON
LAT/LONG Grid	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Mariner Objects				
Object Name	ON	ON	ON	ON
Object Label	ON	ON	ON	ON
Show Hidden Objects	OFF	OFF	OFF	OFF
Orientation Arrow	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Own Ship				
Ship Outline	ON	ON	ON	ON
Ship Symbol	OFF	OFF	OFF	OFF
Heading Vector	ON	ON	ON	ON
Course Vector	ON	ON	ON	ON
Predicted Vector	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Predicted Ship	ON/OFF	ON/OFF	ON/OFF	ON/OFF
History Ship	ON	ON	ON	ON
Ship History	ON	ON	ON	ON

Display Features		Ocean	Coastal	Piloting	Restricted
SDNC Charts					
	Symbolization	Traditional	Traditional	Traditional	Traditional
	Depth Shades	Four	Four	Four	Four
	Shallow Contour (m)	ON	ON	ON	ON
	Deep Contour (m)	ON	ON	ON	ON
	Water – DNC Depth, Depth, DNC Water	ON	ON	ON	ON
	TOD 0	ON	ON	ON	ON
	TOD 2	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Chart Text					
	Navigational Aid Names	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Light Characteristics	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Sound and Color Labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Seabed Characteristics	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Named Locations	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Berth Names	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Other Text	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Chart Features					
	Display Failed Symbolization	ON	ON	ON	ON
	Major Coastal Features	ON	ON	ON	ON
	Conspicuous Landmarks	ON/OFF	ON/OFF	ON	ON
	Shallow Water Pattern	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Swept Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Seabed Dangers	ON	ON	ON	ON
	Traffic Routes	ON	ON	ON	ON
	Restricted and Cautionary Areas	ON	ON	ON	ON
	Information and Protected Areas	ON	ON	ON	ON
	Daymarks	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Buoyage Information	ON/OFF	ON/OFF	ON/OFF	ON/OFF

Display Features		Ocean	Coastal	Piloting	Restricted
	Topmarks	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Lights	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Fog Signals	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	RADAR Navigational Aids	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Pilot and Signal Stations	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Additional Information	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Natural Features	ON/OFF	ON	ON	ON
	Shore Structures	ON/OFF	ON	ON	ON
	Port Features	ON/OFF	ON/OFF	ON/OFF	ON
	Soundings	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Depth Contours	ON	ON	ON	ON
	Currents	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Seabed Information	ON	ON	ON	ON
	Administrative Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	RADAR and Radio Stations	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Coast Guard and Rescue Stations	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Small Craft Facilities	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Targets					
	Symbol	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	ID	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Name	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Platform	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Background	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Alert Radius	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Vector Type	TRUE/REL	TRUE/REL	TRUE/REL	TRUE/REL
	Vector	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Arrow	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	History	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	PPC	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	PADs	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Track Display					

Display Features		Ocean	Coastal	Piloting	Restricted
	GPS FWD	ON/OFF	ON/OFF	ON/OFF	
	GPS AFT	ON/OFF	ON/OFF	ON/OFF	
	Range LOP	ON/OFF	ON/OFF	ON/OFF	
	Comp LOP	ON/OFF	ON/OFF	ON/OFF	
	MANUAL	ON/OFF	ON/OFF	ON/OFF	
	Visual LOP	ON/OFF	ON	ON	ON
Voyage Plans					
	Track Line	ON	ON	ON	ON
	Waypoint Numbers	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Waypoint Names	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Leg Course	ON	ON	ON	ON
	Leg Spd/Dist/Time	ON	ON	ON	ON
	Planned Position	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	Turn Range Navaid	ON/OFF	ON	ON	ON
	Turn Bearing Navaid	ON/OFF	ON	ON	ON
	Slide Bar	ON/OFF	ON	ON	ON
	Time to Wheel Over	ON/OFF	ON	ON	ON
	PIM Plan	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	PIM Spd/Dist/Time	ON/OFF	ON/OFF	ON/OFF	ON/OFF

Table H-1 VMS 7.X/8.X Display Features

VMS VERSION	NOAA ENC (S-57)	CANADIAN HO (S-57)	UK HO (S-63)	AUSTRALIAN HO (S-63)	JAPAN HO (S-63)
VMS 7.7	Y	Y	N	N	N
VMS 8.1	Y	Y	N	N	N
VMS 8.3	Y	Y	N	N	N

Table H-2 VMS 7.X/8.X ENC Capability

APPENDIX I
VMS 9.1/9.3/9.4 DISPLAY FEATURES

1. Utilize Tables I-1 through I-4 to configure the display features in VMS 9.1. Refer to 5000396, Voyage Management System Operators Manual Military Version 9.1 and 5006552, Voyage Management System Operators Manual Military Version 9.3.
2. Per Chapter 1, the operator may be required to utilize ENC libraries.
 - a. In VMS 9.1, the operator is always required to prioritize chart database selections: DNC and/or ENC. The DNC libraries are referred to as “SevenCs – VPF” and the ENC libraries are referred to as “SevenCs - S-57.” In the Chart Databases Menu, VPF must be enabled. When ENCs are utilized, both VPF and S-57 libraries will be enabled and VPF must always be listed above S-57. Under the Auto Scale Preferences, “Allow Automatic Database Selection” must always be off (unchecked). See table I-1. This prevents the system from being able to zoom the chart to such a scale that would not be safe for navigation.
 - b. In VMS 9.3/9.4, the operator is always required to prioritize chart database selections: DNC and/or ENC. The DNC libraries are referred to as “SevenCs – DNC” and the ENC libraries are referred to as “SevenCs - S-57.” In the Chart Databases Menu, DNC must be enabled. When ENCs are utilized, both DNC and S-57 libraries will be enabled and DNC must always be listed above S-57. Under the Auto Scale Preferences, “Allow Automatic Database Selection” must always be off (unchecked).
3. In VMS 9 series, the following alarm notifications are adjustable and should be adjusted to limit constant alarm notifications: Closest Point of Approach (CPA); Time to Closest Point of Approach (TCPA); Bow Crossing Range (BCR); and Bow Crossing Time (BCT). Set point values must be defined in the Ship’s Navigation Bill.
4. VMS 9 series has an alarm muting function. When enabled, all VMS audible alarms are silenced for three minutes (set by the ISEA and maintained by the system administrator). New and existing alarms will be indicated visually. The purpose of the mute button is to silence the alarms temporarily so that watch standers have time to review, take appropriate action, and acknowledge the alarm. After three minutes, the audible alarms return without operator interaction.
5. There are VMS hardware configurations that utilize a Keyboard, Video, and Mouse (KVM) matrix switch to cycle between multiple VMS computers on one monitor. Per reference (k), each VMS monitor is required to display its associated VMS computer. At the start of each watch, the watch stander will verify the workstation in use by checking the selection of the KVM matrix switch. If the incorrect computer is selected, the watch stander will select the correct computer. The selected computer should not change throughout the watch. After the correct computer is selected/verified, the KVM matrix switch should only be used during troubleshooting efforts or casualties to equipment.
6. Table I-9 lists additional Safety Configuration Settings. Values must be defined in the Ship’s NAVBILL.

VMS 9.1 User Profile Settings	Ocean	Coastal	Piloting	Restricted
Chart Dangers				
Alarm on chart cautions (audible)	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Look-ahead distance	10,000 yds	5000 yds	2000 yds	500 yds
Look-ahead time	60 min	30 min	10 min	6 min
Look-ahead type	Time	Time	Time	Time
Proximity buffer size	1000 yds	1000 yds	500 yds	20 yds
Charting – Common				
Deep Contour	Deselect in Selection tab of User Profile Menu			
IMO Display Option	Other Plus	Other Plus	Other Plus	Other Plus
Safety Depth	Deselect in Selection tab of User Profile Menu			
Safety Height	Deselect in Selection tab of User Profile Menu			
Shallow Contour	Deselect in Selection tab of User Profile Menu			
Charting – S-57 ¹				
Data Quality Pattern	OFF	OFF	OFF	OFF
Depth Contour Labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Ignore Time Attributes	OFF	OFF	OFF	OFF
Information Tags	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Light Distinction	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Light Features	ON	ON	ON	ON
Light Sector Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Lights Description Text	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Official Boundary	ON	ON	ON	ON
Overscale Pattern	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Safety Contour Labels	ON	ON	ON	ON
Scamin Filter Warning	ON	ON	ON	ON
Scamin Filtering	OFF	OFF	OFF	OFF
Shallow Pattern	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Shallow Water Danger	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Simplified Symbols	OFF	OFF	OFF	OFF
Soundings (Deep)	ON	ON	ON	ON
Soundings (Shallow) ²	ON	ON	ON	ON
Symbol Filtering	OFF	OFF	OFF	OFF
Text (Important)	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text (Other)	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text Outline	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text Scale	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Two Shade Depths	OFF	OFF	OFF	OFF
Charting - VPF				
GeoSym Beautification	ON	ON	ON	ON
	Ocean	Coastal	Piloting	Restricted

VMS 9.1 User Profile Settings	Ocean	Coastal	Piloting	Restricted
Light Features	ON	ON	ON	ON
Overscale Pattern	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Shallow Pattern	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Simplified Symbols	OFF	OFF	OFF	OFF
Soundings and Depths ³	ON	ON	ON	ON
Symbol Filtering	OFF	OFF	OFF	OFF
Text Information	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text Outline	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text Scale	ON/OFF	ON/OFF	ON/OFF	ON/OFF
TOD Level 0	ON/OFF	ON/OFF	ON/OFF	OFF
TOD Level 2	ON/OFF	ON/OFF	ON/OFF	OFF
Two Shade Depths	OFF	OFF	OFF	OFF
Pos/Scale/Orientation				
Lat/Lon Grid	NAVBILL	NAVBILL	NAVBILL	NAVBILL
Routes				
Display Monitored Route	ON	ON	ON	ON
Show Critical Point Labels	ON	ON	ON	ON
Show Current Turn Bearing ⁴	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Current Turn Range ⁴	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Distance To Turn	ON/OFF	ON	ON	ON
Show Leg Bearings	ON	ON	ON	ON
Show Leg Distance	ON	ON	ON	ON
Show Planned Speeds	ON	ON	ON	ON
Show Planned Wheel over	ON/OFF	ON	ON	ON
Show Slide Bar	ON/OFF	ON	ON	ON
Show Time To Turn	ON/OFF	ON	ON	ON
Show Turn Bearing Object	ON/OFF	ON	ON	ON
Show Turn Range Object	ON/OFF	ON	ON	ON
Show Waypoint Labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Wheel over labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Wheel over Type	Parallel	Parallel	Parallel	Parallel

Table I-1 VMS 9.1 User Profile Settings

NOTES:

1. If ENC libraries are not utilized, deselect “Charting – S-57” in the Selection tab of the User Profile Menu.
2. Depth soundings that are shallower than the Ownship Safety Depth value will be bolded text when using ENCs.
3. Depth soundings that are shallower than the Ownship Safety Depth value will be red text when using DNCs.
4. “Show Current Turn Range” and “Show Current Turn Bearing” labels travel with the ship. When these labels are on, they will overlap with the “Show Distance to Turn” and “Show Time to Turn” labels as the ship nears the turn. To avoid overlap, ships should use the “Turn” tab in the Route Monitor window to view Turn Range and Turn Bearing.

Beam Line Length	10.0 mm
Display True Scale Ship	ON
Display Stern Line	OFF

Display Antenna Position	OFF
Display Vector Tick Marks	ON
Vector Tick Marks Interval	1 min
Display Vector Arrowheads	ON
Predicted Vector	ON/OFF
Predicted Ship	ON/OFF
Predicted Path	ON/OFF
Show Safety Region	ON/OFF

Table I-2 VMS 9.1 Ownship Settings in Display Settings Menu

Anchor Symbol	ON/OFF
Drag Ring	ON
Drop Bearing Object	ON
Drop Range Object	ON
Head Bearing	ON
Inner Range Rings	ON
Letting Go Circle	ON
Outer Range Rings	ON
Swing Ring	ON

Table I-3 VMS 9.1 Anchor Display Settings in Anchoring Menu

NOTE: When the ship is not engaged in an anchoring evolution, deselect Anchoring Feature On in the Anchoring Menu.

Selected Sensor History	ON/OFF
Connect Past Positions	ON
Position Details	ON
Display Events	ON/OFF
Maximum Length	ON/OFF
Spacing of Positions: Desired	ON/OFF
Sensor Histories ¹	ON/OFF

Table I-4 VMS 9.1 Ownship History

NOTE: All available GPS(PPS) and INS sensors should be selected.

VMS VERSION	NOAA ENC (S-57)	CANADIAN HO (S-57)	UK HO (S-63)	AUSTRALIAN HO (S-63)	JAPAN HO (S-63)
VMS 9.1	Y	Y	Y	Y	Y

Table I-5 VMS 9.1 ENC Capability

VMS 9.3/9.4 User Profile Settings	Ocean	Coastal	Piloting	Restricted
All Chart Types				
Chart Scale Boundary	ON	ON	ON	ON
Data Quality Pattern	OFF	OFF	OFF	OFF
Ignore Time Attributes	OFF	OFF	OFF	OFF
Official Boundary	ON	ON	ON	ON
Overscale Pattern	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Scamin Filtering	OFF	OFF	OFF	OFF
Shallow Pattern	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Simplified Symbols	OFF	OFF	OFF	OFF
Two Shade Depths	OFF	OFF	OFF	OFF
Chart Dangers (Also refer to additional items listed in Table K-9)				
Alarm On Chart Cautions	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Look-Ahead Distance	10,000 yds	5000 yds	2000 yds	500 yds
Look-Ahead Time	60 min	30 min	10 min	6 min
Look-Ahead Type	Time	Time	Time	Time
Proximity Buffer Size	1000 yds	1000 yds	500 yds	20 yds
Chart Settings - Other				
Airport Data	ON/OFF	ON/OFF	ON/OFF	ON/OFF
CG or Rescue Stations	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Continental Shelf	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Current Information	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Depth Contours/Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Distance Mark	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Docking Features	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Fishery Zone	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Fishing Features	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Gridiron	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Harbour Type, etc.	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Harbours, etc.	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Information Tags	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Inland Waters	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Label - Safety Contour	ON	ON	ON	ON
Label - Stnd. Contours	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Land Topography	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Land-based Routes	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Low Accuracy Data	ON	ON	ON	ON
Magnetic Information	ON	ON	ON	ON
Nautical Publication	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Obstructions (Known)	ON	ON	ON	ON
Obstructions (Unknown)	ON	ON	ON	ON
Production/Storage	ON/OFF	ON/OFF	ON/OFF	ON/OFF
RADAR or Radio Station	ON	ON	ON	ON
Seabed Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF

VMS 9.3/9.4 User Profile Settings	Ocean	Coastal	Piloting	Restricted
Shore Structures	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Small Craft Facilities	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Soundings	ON	ON	ON	ON
Springs and Seaweed	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Submarine Cable, etc.	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Territorial Areas	ON	ON	ON	ON
Tidal Height Predictions	ON	ON	ON	ON
Tideways	ON	ON	ON	ON
Vegetation Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Water Turbulence	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Chart Settings - Standard				
	Deselect in Selection tab of User Profile Menu			
Anchorage	ON/OFF	ON	ON	ON
Archipelagic Data	ON	ON	ON	ON
Beacons	ON	ON	ON	ON
Built-up Area	ON	ON	ON	ON
Buoys	ON	ON	ON	ON
Cargo/Incineration	ON	ON	ON	ON
Cautionary Areas	ON	ON	ON	ON
Dams and Causeways	ON	ON	ON	ON
Daymark	ON	ON	ON	ON
Direction of Buoyage	ON	ON	ON	ON
Dumping Ground	ON	ON	ON	ON
Ferry Route	ON	ON	ON	ON
Fishing	ON	ON	ON	ON
Geographic Names	ON	ON	ON	ON
Light Vessel	ON	ON	ON	ON
Lights	ON	ON	ON	ON
Low Visibility Aids	ON	ON	ON	ON
Navigation/Traffic Data	ON	ON	ON	ON
New IMO Objects	ON	ON	ON	ON
Pilot Boarding Points	ON/OFF	ON/OFF	ON	ON
Pipelines and Cables	ON	ON	ON	ON
Racon	ON	ON	ON	ON
RADAR Conspicuous	ON	ON	ON	ON
RADAR Data	ON	ON	ON	ON
RADAR Reflector	ON	ON	ON	ON
Radio Calling-in Point	ON/OFF	ON	ON	ON
Recommended Nav	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Restricted Area	ON	ON	ON	ON
Seabed Dangers	ON	ON	ON	ON
Signal Stations	ON	ON	ON	ON
Specialized Areas	ON	ON	ON	ON

VMS 9.3/9.4 User Profile Settings	Ocean	Coastal	Piloting	Restricted
Swept Area	ON	ON	ON	ON
Topmarks	ON	ON	ON	ON
Unknown Objects	ON	ON	ON	ON
Visually Conspicuous	ON	ON	ON	ON
Charting - Common				
Deep Contour	Deselect in Selection tab of User Profile Menu			
IMO Display Option	Custom	Custom	Custom	Custom
Safety Depth	Deselect in Selection tab of User Profile Menu			
Safety Height	Deselect in Selection tab of User Profile Menu			
Shallow Contour	Deselect in Selection tab of User Profile Menu			
Pos/Scale/Orientation				
Lat/Lon Grid	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Routes				
Display Monitored Route	ON	ON	ON	ON
Show Critical Point Labels	ON	ON	ON	ON
Show Current Turn Bearing	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Current Turn Range	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Distance To Turn	ON/OFF	ON	ON	ON
Show Leg Bearings	ON	ON	ON	ON
Show Leg Distance	ON	ON	ON	ON
Show Planned Speeds	ON	ON	ON	ON
Show Planned Wheel over	ON/OFF	ON	ON	ON
Show Route ETA Date	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Route ETA Time	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Route ETD Date	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Route ETD Time	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Route WP Labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show slide bar	ON/OFF	ON	ON	ON
Show time to turn	ON/OFF	ON	ON	ON
Show turn bearing object	ON/OFF	ON	ON	ON
Show turn range object	ON/OFF	ON	ON	ON
Show waypoint labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Wheel over labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Routes – Moving Havens				
Show Buffer	ON	ON	ON	ON
Show Lateral Limits	All legs	All legs	All legs	All legs
Show Moving Havens	ON	ON	ON	ON
Routes - PIM				
Show dist to PIM at OS	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show dist to PIM at PIM	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show Monitored PIM Plan	ON	ON	ON	ON
Show PIM ETA Date	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show PIM ETA Time	ON/OFF	ON/OFF	ON/OFF	ON/OFF

VMS 9.3/9.4 User Profile Settings	Ocean	Coastal	Piloting	Restricted
Show PIM ETD Date	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show PIM ETD Time	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show PIM leg bearings	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show PIM leg distance	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show PIM planned speed	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Show PIM symbol	ON	ON	ON	ON
Show PIM WP labels	ON/OFF	ON/OFF	ON/OFF	ON/OFF
S-57				
Light Distinction	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Light Sector Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Lights Description Text	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Scamin Filter Warning	ON	ON	ON	ON
Symbol Filtering	OFF	OFF	OFF	OFF
Text (Important)	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text (Other)	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text Outline	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text Scale	1.0	1.0	1.0	1.0
TOD0				
Acronym Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Aeronautical NAVAIDS	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Airspace	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Area FOXTROT	ON/OFF	ON/OFF	ON/OFF	ON/OFF
ASW Operating Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Atlantic Fleet Weapons	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Bombing and Strafing	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Control Point/Control Station	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Current Flow/Tidal Streams	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Drill Minefield	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Exercise Area Limit	ON/OFF	ON/OFF	ON/OFF	ON/OFF
FORACS V Limits	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Inwater Tracking Range	ON/OFF	ON/OFF	ON/OFF	ON/OFF
LCAC Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Major Navy Operating	ON	ON	ON	ON
Marine Sanctuary	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Maritime Limits	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Mine Laying Practice Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Minor Navy Operating	ON	ON	ON	ON
Missile Test Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Named Operating Area	ON	ON	ON	ON
Naval Defense Sea Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Naval Operations Area	ON	ON	ON	ON
Range Center Line	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Restricted Areas	ON/OFF	ON/OFF	ON/OFF	ON/OFF

VMS 9.3/9.4 User Profile Settings	Ocean	Coastal	Piloting	Restricted
Safety Fairway	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Sea Test Range	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Submarine Danger Area	ON	ON	ON	ON
Submarine Exercise Area	ON	ON	ON	ON
Submarine Operating Area	ON	ON	ON	ON
Submarine Transit Lane	ON	ON	ON	ON
Submarine Warning Area	ON	ON	ON	ON
Surface Free Lane	ON	ON	ON	ON
Surface Ship Safety Lane	ON	ON	ON	ON
Theodolite Line	ON	ON	ON	ON
Unexploded Ordinance	ON	ON	ON	ON
UQC/WQC Test Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Void Collection Area	ON/OFF	ON/OFF	ON/OFF	ON/OFF
VPF				
Data Quality Areas	ON	ON	ON	ON
GeoSym Beautification	ON	ON	ON	ON
Text Displacement	ON	ON	ON	ON
Text Information	ON	ON	ON	ON
Text Outline	ON/OFF	ON/OFF	ON/OFF	ON/OFF
Text Scale	1.0	1.0	1.0	1.0
TOD Level 0	ON	ON	ON	ON
TOD Level 2	Deselect in Selection tab of User Profile Menu			

Table I-6 VMS 9.3/9.4 User Profile Settings

NOTES:

1. If ENC libraries are not utilized, deselect “Charting – S-57” in the Selection tab of the User Profiles Menu.
2. Depth soundings that are shallower than the Own-ship Safety Depth value will be bolded text when using DNCs and ENCs.
3. If TOD Level 2 libraries are not utilized, deselect “TOD2” in the Selection tab of the User Profiles Menu. If any of these libraries are utilized, then select the appropriate TOD level and select all features associated with the library.

Beam Line Length	10.0 mm
Display True Scale Ship	Default/Custom Symbol (as desired)
Display Stern Line	OFF
Display Antenna Position	OFF
Display Vector Tick Marks	ON
Vector Tick Marks Interval	1 min
Display Vector Arrowheads	ON
Predicted Vector	ON/OFF
Predicted Ship	ON/OFF
Predicted Path	ON/OFF

Table I-7 VMS 9.3/9.4 Ownship Settings in Display Settings Menu

Anchor Symbol	ON/OFF
Drag Ring	ON
Drop Bearing Object	ON
Drop Range Object	ON
Head Bearing	ON
Inner Range Rings	ON
Letting Go Circle	ON
Outer Range Rings	ON
Swing Ring	ON

Table I-8 VMS 9.3/9.4 Anchoring Display in Anchoring Menu

NOTE: When the ship is not engaged in an anchoring evolution, deselect Anchoring Feature On in the Anchoring “Status” tab.

Selected Sensor History	ON/OFF
Connect Past Positions	ON
Position Details	ON
Display Events	ON/OFF
Maximum Length	As Desired
Earliest Time To Show	As Desired
Spacing of Positions: Desired	As Desired
Sensor Histories	(See Note)

Table I-9 VMS 9.3/9.4 Ownship History

NOTE: All available (valid) position sensors should be selected.

Safety Depth	As Applicable
Safety Height	As Applicable
Shallow Contour	As Applicable
Deep Contour	As Applicable
Alarm on Cautions	As Desired
Show Safety Region	ON

Table I-10 VMS 9.3/9.4 Additional Chart Danger Settings

VMS VERSION	NOAA ENC (S-57)	CANADIAN HO (S-57)	UK HO (S-63)	AUSTRALIAN HO (S-63)	JAPAN HO (S-63)
VMS 9.3	Y	Y	Y	Y	Y
VMS 9.4	Y	Y	Y	Y	Y

Table I-11 VMS 9.3/9.4 ENC Capability

APPENDIX J
NAVIGATION BILL

1. The following items are required as part of a ship's Navigation Bill. The items below do not need to be in a specific order.
 - a. Each Commanding Officer (CO) will tailor chapters two, three, and four (plus Appendices C, H, and I, as applicable) as necessary to adapt them to the ship's navigation sensors and data distribution system configuration and organization.
 - b. Primary, secondary and tertiary means of fixing the ship's position, similar to Table 4-B and based upon the reliability of the ship's equipment.
 - c. CO's Safety Depth (Navigation Draft + Safety Factor).
 - d. Fix intervals while at anchor and required means of determining "anchored."
 - e. Establish the precedence of specific fix sources (e.g., GPS, INS, visual, RADAR) for each of the areas identified in Table 3-A.
 - f. Specific procedures for using the APPROVAL authority of the Navigator and a generic CDO Underway (CNAF only) logins.
 - g. For ECDIS-N authorized ships, CO's may designate which node on the bridge will be utilized for primary plot purposes in the Navigation Bill. For non-ECDIS authorized ships, the location of the Primary and Secondary navigation plots must be explicitly defined.
 - h. A tailored display set up, to include alarm settings. Each ECDIS-N display has the ability to load a different display feature/profile set. Pre-evolution checklists will include verification of the displayed feature/profile set, required at each ECDIS-N display.
 - i. Appendix H shows the minimum display requirements. The CO may establish more restrictive settings when desired, but the ships settings must be included as an enclosure to the ship's Navigation Bill. Settings outlined in the ship's Navigation Bill will align with ISEA class advisory messages per the ship's equipment configuration.
 - j. The CO must designate who is authorized to start, stop, load and unload a navigation plan, and designate the requirements and procedures for changing a current navigation plan, or any of its components.
 - k. Describe procedures to ensure the Navigator's and the Navigation Team's role in tactical situations are clearly defined.
 - l. The CO must designate the appropriate command relationships and responsibilities among the CSO, OPS, EMO and Navigator. They must work together to keep all navigation-critical systems operational at all times.
 - m. All objects, layers, or portfolios must be distinctly named. Specify a consistent naming convention that will simplify reviews and allow for rapid building of layers.
 - n. Procedures for voyage plans to be electronically reviewed and approved by the CO.

- o. Casualty procedures in the event of a NAV-1 failure, to rapidly relocate to another node in order to maintain the plot.
- p. Casualty procedures in the ECDIS-N Display Operator/ Navigation Plotter and the Bearing Recorder node fails, to rapidly relocate to another node in order to maintain the plot.
- q. Casualty procedures if the DFGMC does not provide a direct input to ECDIS-N, to pass Magnetic Heading to the Bearing Recorder if a relative-bearing plot is required.
- r. Determine specific codes to indicate type of fixes and fix accuracy for the Ship's Position Log and include these codes in the log.
- s. If the Navigation Workbook data is kept in separate notebooks, detail the procedures to keep the Navigation Workbook data organized.
- t. If locally-produced forms for the Standard Bearing Book are used, define the use and retention of these forms.
- u. Designate the Assistant Navigator if applicable for review and submission of the Ship's Position Report.
- v. Responsibilities and procedures for safe navigation of the ship, including navigation in restricted waters during low visibility.
- w. Define the VMS User Profile Settings and alarm notification settings.

APPENDIX K
STANDARD DAY'S WORK IN NAVIGATION

1. Open Ocean Navigation (Weather permitting; minimum daily).
 - a. Morning Twilight. Usually 45 minutes before sunrise, shoot available celestial bodies, to include selected stars, planet(s), the moon, and Polaris. Reduce sightings to LOPs and determine ship's position. Inform CIC Navigation Team (if manned per NAVBILL) of position.
 - b. Early Morning. Determine gyro error by amplitude of sun or other celestial body.
 - c. 0800-1200. QMOW compute time of LAN (Local Apparent Noon).
 - d. Morning. Shoot sun to determine LOP.
 - e. Mid-morning. Shoot sun to determine LOP. Determine gyro error by azimuth of sun.
 - f. Noon. Observe LAN. Recommend observations be started at 10 minutes before computed time of LAN, and for a couple of minutes after. Reduce sighting and determine ship's latitude. Advance morning and mid-morning sun LOPs to LAN LOP to obtain running fix. Plot running fix and pass fix information to CIC/CDC Navigation Team (if manned per NAVBILL).
 - g. 1200-1600. QMOW determine time of sunset and star time. Compute celestial bodies available, including planets. Determine gyro error by azimuth of sun.
 - h. Afternoon. Shoot sun to determine LOP. Plot running fix and pass fix information to CIC Navigation Team (if manned per NAVBILL).
 - i. Mid-Afternoon. Shoot sun to determine LOP. Advance afternoon LOPs to establish a running fix. Plot and pass information to CIC Navigation Team (if manned per NAVBILL).
 - j. 1600-2000. Compute star time for morning star shoot. Determine celestial bodies available, including planet(s). Determine gyro error by amplitude of sun.
 - k. Evening Twilight. Usually 30 minutes after sunset, shoot celestial bodies, to include selected stars, planet(s), moon, and Polaris. Reduce sightings to LOPs and determine ship's position. Inform CIC Navigation Team (if manned per NAVBILL) of position. QMOW/JOOW determines time of sunrise and moonrise/set for CO's Night Orders.
 - l. Weather observations. Include observations throughout the day.
2. All celestial work must be documented in the ship's Navigation Workbook with the Navigator's signature at the end of each celestial day. When using computer software (i.e., STELLA), documentation of all observations must be maintained in a loose-leaf binder.
3. LCS class is not required to complete items listed above daily; however, proficiency must be maintained and perform on a routine basis.

Standard Day's Work In Navigation Checklist		
Watch	Task	Initials
0000-0400	Determine time of Sunrise	
	Determine time of Civil/ Nautical twilights	
	Determine time of Moonrise/ Moonset	
	Plan for morning stars	
0400-0800	Shoot morning stars and plot position/ verify GPS	
	Gyro error by amplitude at Sunrise	
0800-1200	Two morning sun lines (minimum one hour apart) advanced to LAN time	
	Calculate time of LAN	
	Gyro error by Azimuth	
1200-1600	Latitude at LAN	
	Two afternoon sun lines (minimum one hour apart) and LAN LOP advanced to last sun line	
	Gyro error by azimuth	
	Determine time of Sunset	
	Determine time of Civil/ Nautical twilights	
1600-2000	Determine time of Moonrise/ Moonset	
	Plan for evening stars	
	Gyro error by amplitude at sunset	
	Shoot evening stars and plot position/ verify GPS	

Exhibit K-1 Sample Standard Day's Work In Navigation Checklist

NOTES: This Day's Work will be conducted each day (weather permitting) while operating in open ocean. If weather does not permit, annotate in the "initials" column. Show all computations in the Navigation Workbook or STELLA printouts.

APPENDIX L
REFERENCES

- (a) COMNAVAIRFORINST 3500.20D, Aircraft Carrier Training and Readiness Manual
- (b) COMNAVSURFOR GENADMIN Message 082350z February 2018, Global Positioning System–Positioning, Navigation and Timing (GPS-PNT) Fleet Advisory
- (c) COMNAVSURFPAC/COMNAVSURFLANTINST 3505.1B, Navigation, Seamanship, and Ship-Handling Training
- (d) COMNAVSURFPAC/COMNAVSURFLANTINST 3502.3A, Surface Force Readiness Manual
- (e) MIL-STD, USCG Navigation Rules and Regulations Handbook, 17 February 2018
- (f) COMNAVSURFPAC/COMNAVSURFLANTINST 4700.3, Fleet Introduction of New Construction Ships
- (g) COMPACFLT/COMUSFLTFORCOMINST 3530.1A, Fleet Navigation Policy and Standards
- (h) COMPACFLTINST 3140.3C, Geospatial Product Allowance
- (i) COMUSFLTFORCOMINST 3140.9B, Geospatial Product Allowance
- (j) CJCSI 6130.01E, CJCS Master Positioning, Navigation, and Timing Plan
- (k) OPNAVINST 9420.2A, Implementation of the Electronic Chart Display and Information System Certification Process
- (l) OPNAVINST 3120.32D, Standard Organization and Regulations of the U.S. Navy
- (m) U.S. Navy Regulations, 1990
- (n) COMNAVSURFPAC/COMNAVSURFLANTINST 3502.6, Littoral Combat Ship Training and Readiness Manual
- (o) COMNAVSURFPAC/COMNAVSURFLANTINST 3500.10A, Readiness Evaluations
- (p) COMNAVSURFPACINST 3040.1A, Surface Force Critiques and Lessons Learned
- (q) COMNAVSURFLANTINST 3040.1C, Significant Event/Near-Miss Reporting
- (r) OPNAVINST C3000.8N
- (s) NAVPUB 9, The American Practical Navigator
- (t) COMNAVSURFPAC/COMNAVSURFLANTINST 3504.1, Redlines
- (u) OPNAVINST 3100.7C, Preparing, Maintaining, and Submitting the Ship's Deck Log
- (v) COMNAVMETOCOMINST 3144.1M, U.S. Navy Manual for Ship's Surface Weather Observations
- (w) NAVSEAINST 9420.4, Certification of Navigation Systems
- (x) COMNAVSURFPAC/COMNAVSURFLANTINST 9000.1, Littoral Combat Ship Requirements Deviation Policy
- (y) COMNAVSURFPAC/COMNAVSURFLANTINST 3120.2, Comprehensive Fatigue and Endurance Management Policy (CFEMP)