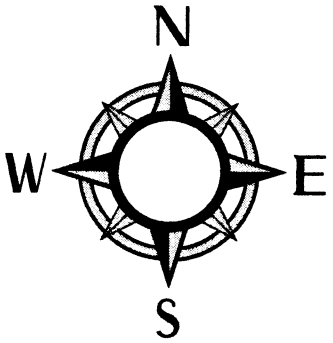
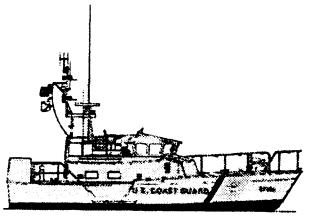
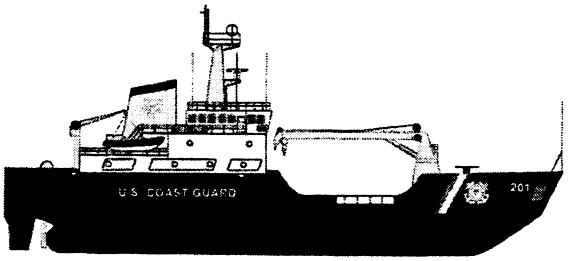
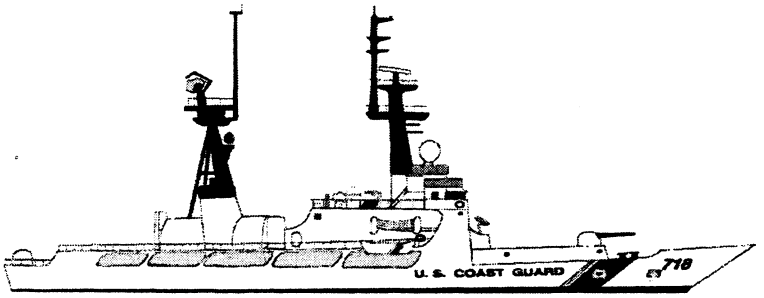
U.S. Department
of Transportation

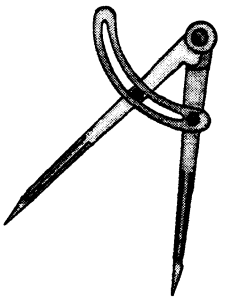
**United States
Coast Guard**











Coast Guard Navigation Standards

COMDTINST M3530.2A

U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S W.
Washington, DC 20593-0001
Staff Symbol: G-OCU
Phone: (202) 267-1768

COMDTINST M3530.2A

MAY 16 2002

COMMANDANT INSTRUCTION M3530.2A

Subj: COAST GUARD NAVIGATION STANDARDS MANUAL

Ref:
(a) U. S. Coast Guard Regulations, COMDTINST M5000.3 (series)
(b) Cutter Training and Qualification Manual, COMDTINST M3502.4 (series)
(c) Cutter Organization Manual, COMDTINST M5400.16 (series)
(d) Boat Crew Training Manual, COMDTINST M16114.9 (series)
(e) Boat Crew Seamanship Manual, COMDTINST M16114.5 (series)
(f) Boat Crew Qualification Guide, Vol I-Crew Member, COMDTINST M16114.10 (series)
(g) Boat Crew Qualification Guide, Vol II-Coxswain, COMDTINST M16114.11 (series)
(h) Group and Stations Communications Watchstander Qualification Guide, COMDTINST M16120.7 (series)
(i) Operational Risk Management, COMDTINST 3500.3 (series)
(j) Procedures for the Preparation and Disposition of Cutter Logs, COMDTINST M3123.12 (series)

1. PURPOSE. This Manual promulgates navigation policies and procedures for all cutters and shore based boats.

2. ACTION. Area and district commanders, commanders of maintenance and logistics commands, and unit commanding officers and officers-in-charge (CO/OIC) shall ensure the requirements of this manual are included as appropriate in the area and district training team curricula, TSTA, SEOPS, STANTEAM and other training and inspection programs. Internet release is not authorized.

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3. DIRECTIVES AFFECTED. Cutter Navigation Standards and Procedures, COMDTINST 3530.2 is hereby canceled.

4. SUMMARY.

   a. This Manual is designed to assist the CO/OIC, navigator and coxswain in carrying out their responsibilities as outlined in reference (a). Chapter one provides guidance, policy and procedures for safe cutter navigation. Chapter two provides guidance, policy and procedures for safe shore based boat navigation.

   b. This Manual is not all inclusive on cutter navigation due to many variables such as differing cutter types, personnel qualification and experience, operating areas, etc. Development and implementation of sound command navigation standards and proper risk management is imperative.

5. CHANGES. Change recommendations should be routed via the chain of command to Commandant (G-OCU) for cutters and (G-OCS) for shored based boats.

6. FORMS AVAILABILITY. The "CG" forms discussed in this manual, Deck Logs (CG-4380A, CG-4380B and CG-4380C), are available in Jetform Filler and through the stock system. Jetform Filler templates may be downloaded from http://www.uscg.mil/hq/g-s/g-si/g-sii/forms/formindx.htm. A sample Deck Log is available on the web at http://cgweb.comdt.uscg.mil/g-ocu/g-ocu.htm.

TERRY M. CROSS
Assistant Commandant for Operations

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(7) Unit Level Guidance For Shore Based Boats

CHANGE RECOMMENDATION

PUBLICATION: _____ DATE: _____

TYPE OF CHANGE: ADD: _____ DELETE: _____ MODIFY: _____

EXACT CHANGES RECOMMENDED:

RATIONALE:

SUBMITTED BY: _____
(ORIGINATING COMMAND)

POINT OF CONTACT: _____ PHONE NUMBER: _____

HQ ACTION: _____ ACCEPTED: _____ MODIFIED: _____ REJECTED: _____
(HQ DIV)

REMARKS:

SEND ALL CHANGE RECOMMENDATIONS TO COMMANDANT (G-OCU)

RECORD OF CHANGES

CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	BY WHOM ENTERED

CHAPTER 1. CUTTER NAVIGATION

A. Purpose. This chapter provides guidance, policy and procedures for safe cutter navigation and was developed to assist the commanding officer/officer-in-charge (CO/OIC), and navigator in carrying out their responsibilities outlined in U. S. Coast Guard Regulations, COMDTINST M5000.3 (series).

B. Command Responsibilities. CO/OICs shall:

1. Ensure compliance with the provisions of this Manual.

2. Assign, train and qualify navigation personnel in accordance with U.S. Coast Guard Regulations, COMDTINST M5000.3 (series) and the Cutter Training and Qualification Manual, COMDTINST M3502.4 (series).

3. Conduct navigation exercises in accordance with the Cutter Training and Qualification Manual, COMDTINST M3502.4 (series).

4. Develop Special Sea Detail, Anchoring and Mooring Bills in accordance with the Cutter Organization Manual, COMDTINST M5400.16 (series) and relevant sections of this chapter. Procedures will reflect cutter specific requirements.

C. Command Navigation Standards. This section outlines the minimum information required for inclusion in the Command Navigation Standards.

1. CO/OICs shall promulgate Command Navigation Standards that, at a minimum, include:

   a. Standard helm and engine order commands (see enclosure (1)).

   b. Standard linehandling commands. Enclosure (2) may be used for this purpose either in its entirety, or tailored as deemed appropriate.

   c. Standard navigation plotting symbols. Enclosure (3) may be used for this purpose either in its entirety, or tailored as deemed appropriate.

   d. Command definition of navigational zones to include restricted waters and open ocean. CO/OICs may also designate additional navigational zones to allow for specific manning and fix interval standards based on different operating environments.

   e. Standard navigation fix intervals for each navigational zone.

   f. Cutter's navigational draft.

   g. Definition of shoal water for the cutter and method to identify shoal water on charts.

   h. Specific charts of the cutter's allowance that comprise the "Ready Chart List".

i. Specific guidance concerning navigation of the cutter's small boat(s) while operating independently of the cutter.

j. Specific navigation team manning requirements for each navigational zone. Include provisions for navigating with electronic navigation systems and/or paper charts.

2. OICs of WLI's and WYTL's, while operating on rivers, and the WLR class shall also include in their Command Navigation Standards information similar to that described in Chapter 1, Section F, tailored as appropriate for the specific class of vessel and environment.

D. Navigation Briefs and Planning. This section discusses the purpose and outlines the requirements for navigation briefs.

1. Mission Analysis. CO/OICs shall incorporate the principles of effective mission analysis and risk assessment into their navigation planning in accordance with Operational Risk Management, COMDTINST 3500.3 (series). The mission analysis process may be tailored consistent with the complexity of the specific mission, but should not omit any step in the process.

2. Navigation Planning.

a. Navigation planning encompasses the development of long and short-term plans as well as contingency plans for a mission. The cutter's Watch, Quarter and Station Bill (WQSB), navigation standards, standing orders, operational bills and navigation checklists constitute pre-established long-term operational plans for safe and successful navigation. These plans provide a framework for the cutter while executing a mission, and may be tailored to meet the unique requirements of each mission.

b. The navigator is charged with preparing a plan for safe and prudent passage or short-term navigation plan. These plans may be very elaborate, consisting of complete track lines, piloting procedures, patrol areas, etc., or simply the conning officer's intentions for shifting berths. The plan shall be approved by the CO/OIC. Comply with the following when preparing all plans:

(1) Consult appropriate references. The publications listed below are essential references that shall be consulted during navigation planning, when applicable. Some of these references may be available as electronic data products readable by ECDIS, ECINS or ECS software applications. In all cases, the navigator must ensure all publication corrections have been applied.

(a) Coast Pilot.

(b) Fleet Guides.

(c) Sailing Directions.

(d) OPORDERS.

(e) Coast Guard Navigation Center, Navigation Information Service.

(f) Naval Operating Area Instructions.

(g) Light List(s) and the List of Lights.

(h) Radio Aids to Navigation, PUB 117A.

(i) Notices to Mariners, Local Notices to Mariners and Broadcast Notice to Mariners.

(j) NAVAREA, HYDROLANT, HYDROPAC Messages.

(k) Tide Tables.

(l) Tidal Current Tables.

(m)Nautical Almanac.

(n) Navigation Rules, International-Inland, COMDTINST M16672.2 (series).

(2) Determine when the Engineering Restricted Maneuvering Doctrine will be implemented.

(3) Conduct a navigation brief prior to getting underway, entering port and, if possible, prior to entering restricted waters. Navigation brief duration, content and attendance may be tailored to meet the requirements of a specific mission. Navigation briefs shall include the following information, when applicable:

(a) Anticipated time of setting Special Sea Detail, Anchoring and Mooring Bills, Navigation Detail, and Restricted Maneuvering Bill.

(b) Assignment of navigation team positions including review of duties.

(c) Review of charts and intended track.

(d) Chart datum (NAD 83, WGS 84, etc.).

(e) Chart shifts.

(f) Planned fix interval.

(g) Maximum allowable deviation from track.

(h) Speed of advance and maximum safe speed.

(i) Buoyage system.

(j) Expected sightings and description of key aids to navigation.

(k) Navigation equipment status.

(l) Status of electronic navigation sources (GPS, DGPS, LORAN) to include expected accuracy and outages.

(m) Engineering plant status.

(n) Hazards to navigation, danger bearings/ranges, danger soundings, navigation warnings, bridge vertical clearances, bridge signals and radio capability.

(o) Areas where the cutter can divert to anchor in emergencies.

(p) Anticipated traffic (include reminder to avoid meeting deep draft vessels at turns and intersections).

(q) Traffic Separation Schemes.

(r) Port or Vessel Traffic Service (VTS) requirements.

(s) Environmental considerations including tides, currents, weather (e.g., winds, precipitation, visibility), and designated environmentally sensitive areas (e.g., marine sanctuaries).

(t) Demarcation lines (Inland/International Rules of the Road).

(u) Communication requirements.

(v) Mooring or anchoring arrangements including time to moor/unmoor and pier heading.

(w) Ordnance disposal areas.

(x) Discuss risk assessment results for the particular mission.

(4) Cutters are encouraged to conduct a debrief following navigation evolutions to evaluate and recognize performance.

E. Standard Navigation Team Positions and Qualifications. This section states the general duties and qualification requirements for navigation team positions. Navigation team positions shall be assigned as appropriate based on cutter capability and billet structure.

1. Bridge Navigation Team Organization. Bridge Navigation Team members shall complete applicable sections of U.S. Navy Ship Control and Navigation Personnel Qualification Standard (PQS), NAVEDTRA 43492-2 (series) and/or cutter specific Job Qualification Requirement (JQR) for their assigned billets in accordance with the Cutter Training and Qualification Manual, COMDTINST M3502.4 (series).

a. Navigator. Duties and assignment of cutter navigators shall be in accordance with U.S. Coast Guard Regulations, COMDTINST M5000.3 (series). However due to the size, billet structure, and nature of duties of some cutters, it may not be possible to comply with the assignment criteria. In those cases, the assignment of the duties of navigator shall be based on the proficiency, training, maturity and judgment of the individual being considered for the position. Navigators shall be a qualified underway Officer of the Deck on the cutter presently assigned.

b. Navigation Evaluator. If not the navigator, this person is responsible to the navigator for evaluating fix accuracy from the bridge and CIC/CSC (if equipped), evaluating ship's projected movements and making reports to the conning officer as specified in Chapter 1, Section F.1.c. Coordinates the actions of all bridge navigation team members.

c. Navigation Plotter. Maintains the navigation plot. Plots and labels each fix on the chart in use. Extends the DR at least two fix intervals, computes set and drift since last fix, identifies nearest hazard to navigation, time and distance to the next course change, revises turn bearings and completes other tasks as directed by the navigator/navigation evaluator. The navigation plotter should not be the same individual as the navigation evaluator unless cutter personnel strength precludes this.

d. Bearing Book Recorder. Maintains the Standard Bearing Book (OPNAV Form 3530/3 or equivalent) in accordance with current directives. Maintains communications with the bearing takers, marks fixes at intervals specified by the navigation evaluator, and passes navigation information to the navigation plotter/navigation evaluator.

e. Bearing Takers. Obtain accurate bearings to navigation aids designated by the navigation plotter/navigation evaluator. Advises the navigation plotter regarding the navigation aids available for use, including when navigation aids are acquired visually or lost from sight.

f. Bridge Radar Observer. Provides all radar navigation data as directed by the navigation plotter/navigation evaluator. Performs the duties of shipping officer/radar operator on cutters without a CIC/CSC.

g. Leadsman. Passes soundings to the bridge for comparison with the fathometer and the charted depth.

2. CIC/CSC Navigation Team Organization. CIC/CSC Navigation Team members shall complete applicable sections of U.S. Navy CIC Common Core Watch PQS, NAVEDTRA 43311-4 (series) and/or cutter specific JQR for their assigned billets in accordance with the Cutter Training and Qualification Manual, COMDTINST M3502.4 (series). On cutters without a CIC/CSC, some sections of this PQS may be applicable for the Bridge Navigation Team (e.g., shipping officer, shipping radar operator).

a. Piloting Officer. Evaluates fix accuracy and makes recommendations to the navigation evaluator based on CIC/CSC's navigation plot. Keeps shipping officer advised of course/speed changes. Supervises the navigation radar operator, navigation plotter and navigation recorder.

b. Shipping Officer. Evaluates surface picture. Designates contacts to be watched or tracked in accordance with ship's directives. Verifies the recommended course is clear of all surface contacts.

c. Shipping Radar Operator. Provides all radar data as directed by the shipping officer.

d. Navigation Radar Operator. Provides all navigation radar data as directed by the piloting officer. Maintains communications with, and keeps the navigation plotter informed of designated points available for use.

e. Navigation Plotter. Maintains CIC/CSC's navigation plot. Plots and labels each fix on the chart in use. Extends the DR at least two fix intervals, computes set and drift and evaluates ship's projected movements, time and distance to the next course change, revised turning bearings and ranges, and completes other tasks as directed by the piloting officer.

f. Navigation Recorder. Logs all piloting officer recommendations as well as the standard fix report. Assumes responsibility from the bearing book recorder for designating times of fixes when CIC/CSC has been designated as the primary navigation plot.

F. Navigation Requirements. This section sets forth minimum requirements not addressed elsewhere in this manual. WLI's and WYTL's, while operating on rivers, and the WLR class are exempt from the specific requirements of this section. However, OICs of these units shall tailor the requirements of this section, as appropriate, for incorporation in their Command Navigation Standards.

1. General.

a. Checklists for getting underway and entering port/approaching restricted waters shall be created, maintained and completed in accordance with enclosures (5) and (6).

b. On ships with a CIC/CSC, the bridge navigation plot shall normally be designated as the primary navigation plot. Navigation information maintained in CIC/CSC shall normally be designated as the secondary navigation plot, supplementing the primary plot. The commanding officer may authorize a shift in the location of the primary plot to suit a particular situation (e.g., restricted visibility)

c. Whenever the Navigation Detail is set or otherwise deemed appropriate by the CO/OIC, the navigation evaluator shall report the following information to the CO/OIC, conning officer and navigator at each fix:

(1) Fix time.

(2) Fix type and quality.

(3) Fix position in relation to proposed track.

(4) Report CIC/CSC concurs, does not concur, or has no fix.

(5) Any recommendation to regain/maintain proposed track.

(6) Nearest hazard to navigation.

(7) Next aid to navigation.

(8) Distance to next turn.

(9) Time to next turn and turn bearing/turn range.

(10) Course after next turn.

(11) Set and drift (as required).

(12) Depth of water beneath the keel and comparison to charted depth.

d. Charts used shall be of the largest scale available. Prior to use, charts shall be corrected using all available information.

e. The ship's proposed track shall be laid down identically on all charts used for navigation and labeled with the course (true and magnetic) of each track leg. CIC/CSC navigation charts, if applicable, shall be compared to the bridge navigation charts.

f. All charts shall be reviewed to ensure that hazards to navigation, including overhead obstructions and shoal water, are properly displayed and/or highlighted.

g. If conditions permit, gyro error shall be determined at least once daily while underway. Each time gyro error is obtained, gyrocompass(es) and repeaters shall be compared and errors posted.

2. Fixes.

a. One of the following criteria must be met in order to constitute a proper fix:

(1) Electronic fix in the form of latitude and longitude obtained from electronic navigation systems (GPS, Loran, etc.) and plotted on a paper chart.

(2) Ship's position as plotted by an ECINS/ECS system using GPS input.

(3) The intersection of at least three visual lines of position (LOP), radar ranges, or a combination of visual LOPs and radar ranges from at least three prominent points of land or fixed objects. This includes "map matching" capability.

(4) When using relative bearings, a minimum of two visual LOPs and one radar range shall be used.

b. The ship's position shall be fixed at an interval that ensures safe navigation, not to exceed one hour.

c. A fix shall not be erased or deleted because it appears in error; rather, another fix shall be taken immediately to ascertain the ship's position.

d. Fixes shall be verified by all available means including soundings, AtoN, radar or other electronic means. Do not rely solely upon one positioning method.

e. Set and drift shall be determined at every fix if the fix interval is greater than three minutes. If the fix interval is less than three minutes, set and drift shall be determined at least every second fix. Set and drift shall be applied to subsequent dead reckoning (DR) positions to determine an estimated position (EP) in the event that planned fixes are not obtained.

f. Every fix shall be labeled and have a properly labeled DR track projected for at least two fix intervals.

3. Estimated Position. An EP is a DR position modified by additional information, which in itself is insufficient to establish a fix.

a. The following criteria constitute an EP: The intersection of less than three visual LOPs (true or relative), radar ranges, or a combination of visual LOPs and radar ranges from less than three prominent points of land or fixed objects .

b. Similar to fixes, EPs shall be verified by all available means including soundings, AtoN, radar or other electronic means.

4. Restricted Waters. This section establishes additional requirements while transiting in or near restricted waters.

a. Charts with tracklines in restricted waters shall be checked independently, by a second person, for accuracy.

b. In addition to the course of each track leg, the following items shall be accurately plotted and labeled on the chart:

(1) Distance of track leg.

(2) Danger bearings and ranges to navigation hazards not marked by navigation aids.

(3) Turn bearings (true and relative), turn ranges (in yards) and slide lines allowing for the ship's tactical data. Intended speed/rudder combination for each turn shall be indicated.

c. Bridge and CIC/CSC shall not shift charts at the same time, nor shall they shift during, or at the time of, an impending turn. The bridge or CIC/CSC shall have a fix plotted before the next station shifts charts.

d. Tide and current information shall be posted at all conning stations and in CIC/CSC, if applicable. Graphing of tide and current information is recommended.

5. Positioning Sources. Figure 1-1 depicts the preferred hierarchy of various positioning sources. Category I positioning sources are adequate for use as the primary source of own ship's position while operating in restricted waters. Category II positioning sources are not considered adequate for precision navigation and shall only be used as the primary source of own ship's position in open ocean.

POSITIONING SOURCES

CATEGORY I
Differential GPS
GPS PPS (Precise Positioning Service)
Combined GPS/GLONASS (see Note 1)
GPS SPS (Standard Positioning Service) (see Note 2)
Visual and/or RADAR (includes Mapmatch)
Inertial Navigation System
CATEGORY II
LORAN-C
Celestial

Figure 1-1

Note 1 – The Russian GLONASS (Global Navigation Satellite System) constellation is not adequately developed to provide constant coverage worldwide. Computer software is required to predict the availability of GLONASS coverage. At times, when GLONASS enhancement to GPS exists, the resultant fix information can be very accurate. If the enhancement is not available, the fix information is derived from GPS only. The mariner must be cautious when evaluating the accuracy of this hybrid positioning source.

Note 2 – This assumes that Selective Availability (SA) is set to zero. When this instruction was promulgated (SA) was set to zero and the Department of Defense (DoD) had no intention of ever employing its use on a worldwide scale. However, personnel involved with navigation must be aware that DoD may regionally select signal degradation using SA or other tactics. Therefore, cutters deploying abroad may require the use of PPS or other enhancement to ensure accurate fix information is being received. When intentional GPS signal degradation such as SA is being used, SPS shall be considered a Category II source, not adequate for navigation in restricted waters.

6. ECS/ECINS. This section provides definitions that pertain to electronic navigation and sets forth when, and under what conditions, electronic navigation systems may be used.

   a. Definitions.

      (1) ENC - Electronic Navigational Chart is the database, standardized as to content, structure and format, issued for use with Electronic Chart Display and Information Systems (ECDIS) on the authority of a government hydrographic office. An ENC contains all the chart information necessary for safe navigation, and may contain supplementary information in addition to that contained on a paper chart, which may be considered necessary for safe navigation (e.g., sailing directions).

      (2) ECDIS - Electronic Chart Display and Information System is an internationally recognized navigation system that, when used with an ENC, is an internationally accepted alternative to navigating with a paper chart. ECDIS standards are established by the International Maritime Organization, the International Hydrographic Organization and the International Electrotechnical Commission. An ECDIS must have route planning and route monitoring functions, a continuous display of accurate and up-to-date chart and position information, the ability to perform and execute in a timely manner all routines currently provided by a paper chart, an adequate back-up system, capability for automated chart updating and a voyage recording function.

      (3) ECS - Electronic Chart System is a navigational aid that meets the recommended standards established by the Radio Technical Commission for Maritime Services (RTCM) for displaying vessel position and relevant navigational and nautical chart information on an electronic display. An ECS is a situational awareness tool and is neither an equivalent to, nor a replacement for, paper charts. "The Cap'n" is an example of an ECS that is commonly used aboard our cutters.

      (4) ECINS - Electronic Charting and Integrated Navigation System is the term for several electronic navigation systems presently installed on Coast Guard cutters, that, when used with approved electronic chart types, adequate positioning sources and adequate back-up arrangements, is an alternative to navigating with a paper chart aboard those cutters. Just like ECDIS, an ECINS must have route planning and route monitoring functions, a continuous display of accurate and up-

to-date chart and position information, the ability to perform and execute in a timely manner all routines currently provided by a paper chart, capability for automated chart updating, and a voyage recording function. The Coast Guard has already employed several systems that were purchased or developed with the intent of meeting or exceeding the functionality of the international standards for ECDIS and INS, but include deliberate additions to, and deviations from, those standards. Coast Guard operations may require that electronic charting equipment be integrated with other cutter systems. Coast Guard ECINS currently include the "Electronic Chart Precise Integrated Navigation System (ECPINS)" produced by Offshore Systems Limited (OSL), the Shipboard Command and Control System (SCCS) employing the Command and Display Control Integrated Navigation System (C-INS), the "Navi-Sailor 2400 ECDIS" produced by Transas, and the Vision 2100M IBS employing the Voyage Management System produced by Litton Marine Systems.

(5) Electronic charts - Charts that have been developed for display on an electronic medium. They come in a variety of formats including S-57 vector format, other vector formats that include NIMA produced Digital Nautical Charts® (DNCs), and raster formats which are electronically scanned versions of paper charts.

(6) Approved chart types - Coast Guard missions require cutters to operate in waters that are not adequately covered by official ENC. Until official ENC are available for all areas, the Coast Guard has approved the following chart types for use with Coast Guard ECINS:

(a) S-57 charts issued on the authority of a government hydrographic office (i.e., NOAA, Canadian Hydrographic Service).

(b) Digital Nautical Charts® (DNCs) issued by NIMA.

(c) Commercial vector charts that have been procured under contract with a source approved by Coast Guard Headquarters.

(d) If vector charts meeting the standards above are not available for a particular geographic area, then raster charts issued on the authority of a government hydrographic office or procured from a source approved by Coast Guard Headquarters are authorized.

(7) Up-to-date chart - A chart that has been corrected through the latest available update issued by the cognizant hydrographic office and Coast Guard Local Notice to Mariners.

(8) Adequate back-up arrangement - Redundant capability that enables the continuous operation of essential ECINS functions in order to ensure that a failure does not result in a potentially dangerous situation. Acceptable back-up

arrangements include fully integrated redundancy within the ECINS (e.g., an ECINS with multiple computers), redundant ECINS or an independent ECS.

(9) Adequate back-up positioning source - An adequate positioning source that does not rely on any common elements as the primary source (e.g. A back-up GPS receiver is not an adequate back-up for primary GPS). This requirement is intended to provide an alternative positioning data source in the event of catastrophic failure of the GPS constellation. Examples of adequate back-up positioning sources for GPS are LORAN, radar or visual lines of position.

b. An ECS using up-to-date approved chart types may be used as the primary means of navigation in open ocean. When using an ECS as the primary means of navigation, up-to-date paper charts shall be available to transfer the plot within one fix interval.

c. An ECINS using up-to-date approved chart types may be used as the primary means of navigation subject to the conditions set forth in enclosure (4).

7. Celestial Navigation. This section states the basic requirements for celestial navigation.

a. WAGBs (except MACKINAW), WHECs, WMECs and WIX shall maintain proficiency in the art of celestial navigation. To be considered proficient, cutters must be able to:

(1) Manually determine the time of sunrise and sunset.

(2) Manually determine the time of moonrise and moonset.

(3) Manually determine gyro error by azimuth of the sun or other celestial body.

(4) Manually determine gyro error by amplitude of the sun or other celestial body.

(5) Obtain an LOP from the sun.

(6) Observe Local Apparent Noon (LAN). Manually reduce sighting and determine ship's latitude.

(7) Obtain the ship's position by reducing star sights to a fix.

(8) Manually compute latitude and gyro error by Polaris.

b. All celestial work must be documented in the ship's Navigation Workbook. Units using the STELLA software package to perform celestial computations shall follow the guidelines in Chapter 1, Section G.3.

c. Weather and operations permitting, cutters shall take advantage of opportunities to maintain their proficiency in celestial navigation.

d. Nothing in this section shall be construed so as to relieve members of their responsibility for the completion of celestial navigation portions of relevant PQS.

G. Logs, Records and Checklists. This section outlines the procedures and requirements for maintaining navigational documents.

1. Corrections. Erasures are strictly forbidden in all navigation logs and records except in the Navigation Workbook. Corrections shall be made by neatly lining out and initialing an entry. Ball-point pen shall be used throughout, except in the Navigation Workbook where pencil is authorized.

2. Deck Logs. The Deck Log (CG-4380A, CG-4380B and CG-4380C) shall be maintained in accordance with Procedures for the Preparation and Disposition of Cutter Logs, COMDTINST 3123.12 (series).

3. Navigation Workbook. The Navigation Workbook is a record of observations and computations used for navigation of the ship. This shall include data relating to celestial lines of position, tides, currents and gyro error. In view of the large amount of data that may be recorded, ships may organize data into separate notebooks as directed by the CO/OIC. The Navigation Workbook and all electronic records shall be retained on board for a period of three years from the date of last entry.

   a. When using computer software for computations, the results may be printed and maintained with the navigation workbook or stored electronically, in a retrievable format.

   b. Units using the STELLA software package to perform celestial computations must print out the STELLA navigation log after each celestial observation.

   c. Locally prepared strip forms, if used, shall be affixed to or recorded in the workbook.

   d. If calculators are used, enough data must be recorded in the workbook to reconstruct the computation.

4. Standard Bearing Book. The Standard Bearing Book is a record of the data obtained to determine the ship's position by visual bearings, sextant angles, radar ranges and electronic LOPs. It shall be maintained in accordance with the procedures described below. The Standard Bearing Book shall be retained on board for a period of three years from the date of last entry.

   a. The chart number in use shall be recorded at the top of the initial page each day. Each shift of charts shall be noted in the first available blank line.

   b. The time zone and date shall be indicated.

c. Radar ranges shall be labeled YD (yards) or NM (nautical miles).

d. Soundings shall be recorded at the time each fix is obtained and labeled FT (feet), FM (fathoms) or M (meters).

e. All bearings are true, unless otherwise indicated by R (relative) or M (magnetic). When shifting to R (relative), the shift shall be noted on the first available blank line and the ship's heading shall be recorded with each fix.

f. All abbreviations shall be in accordance with Chart No. 1, Nautical Chart Symbols and Abbreviations.

g. Gyro error shall be recorded at the top of the initial page each day. Any revised gyro error shall be noted in the first available blank line. The radar range error, if determined, shall be entered at the top of the initial page each day.

h. A list of navigation aids (object list) must be maintained in the bearing book or maintained as part of a gazetteer containing object lists for all piloting charts. If a gazetteer is maintained, it must be kept in close proximity to the plotting station for ready reference. Object lists must include the chart number, noun name, latitude and longitude, and designation of the object. Object lists maintained on the bridge and in CIC/CSC must be identical.

i. The bearing recorder, at the end of the watch or navigation detail, shall sign the Standard Bearing Book on the next available line.

5. CIC/CSC Navigation Log. The purpose of the CIC/CSC Navigation Log is to provide a record of the data obtained to determine the ship's position by radar. It shall be maintained by CIC/CSC in accordance with the procedures described below. The CIC Navigation Log shall be retained on board for three years after the date of the last entry.

a. At the top of each page, enter the date, chart number and gyro error. Any revised gyro error shall be noted in the log. The radar range error, if determined, shall be entered at the top of the initial page each day.

b. The following information shall be logged at the time of each fix:

(1) Identification of landmarks utilized.

(2) Ship's position relative to track.

(3) Recommended course and speed.

(4) Nearest shoal water.

(5) Distance to turn.

(6) Time to turn.

(7) Nearest aid to navigation.

(8) Soundings at the time each fix is obtained, labeled FT (feet), FM (fathoms) or M (meters).

(9) Set and drift (as required).

(10) Any pertinent remarks (e.g., conn concurs or does not concur).

c. When the navigation detail is secured, an entry shall be made on the next available line in the log. A single line shall be drawn through the remainder of the page with the log keeper's signature appearing on the line.

d. Radar ranges shall be labeled YD (yards) or NM (nautical miles).

e. All abbreviations shall be in accordance with Chart No. 1, Nautical Chart Symbols and Abbreviations, unless promulgated separately in the log.

f. A list of navigation aids (object list) must be permanently maintained in the CIC Navigation Log or maintained as part of a gazetteer containing object lists for all piloting charts. If a gazetteer is maintained, it must be kept in close proximity to the plotting station for ready reference. Object lists must include the chart number, noun name, latitude and longitude, and designation of the object. Object lists maintained on the bridge and in CIC/CSC must be identical.

6. Captain's Night Orders. The Captain's Night Order Book has been traditionally maintained in bound ledger or loose-leaf form. The orders for each night are written and signed by the commanding officer. They include such items as courses and speeds to be maintained throughout the night, expected sightings, engineering data, the tactical situation, and supplementary orders to the Officer of the Deck (OOD). The Captain's Night Order Book shall be retained on board for three years after the date of the last entry. CO/OICs may optionally utilize electronic media to convey night orders to the crew. With either option, safeguards must be in place to ensure that the Deck Watch Officers and other key personnel acknowledge the orders. Similar to the traditional Night Order Book, electronic night orders shall be retained and accessible on board the cutter for three years.

CHAPTER 2. SHORE BASED BOAT PILOTING AND NAVIGATION

A. Discussion.

1. Results of Standardization Team (STANTEAM) readiness assessments and boat mishap reviews have highlighted the need for a shore based boat piloting and navigation policy. Unlike navigating a ship with an established navigation team and well-equipped bridge, boat navigation rests primarily with the coxswain. STANTEAM readiness assessments have shown a decline in basic skill sets related to navigation such as plotting a position, recognizing when the vessel is being set off the anticipated DR track, and maneuvering to a plotted position within a specified standard. Whether using a fully integrated electronic navigation system or the most basic manual navigation tools, the coxswain must use all resources and information to assess the vessel's position, course, and speed with a high degree of accuracy. In addition to navigating the vessel, the coxswain must track and avoid known hazards and other marine traffic, as well as execute the intended mission.

2. Most mishaps occur because coxswains and crews failed to use or properly interpret available information. Among the most common factors are:

   a. Lack of in-depth knowledge of hazards within the local operating area, coupled with minimal underway experience.

   b. Failure to recognize the significance or properly evaluate all available navigation information (i.e. soundings, cross track error, natural ranges) while operating in close proximity to shoals.

   c. Excessive speed in the vicinity of shoals or other navigation hazards.

   d. Coxswain's focus or reliance on only one source of navigation information.

   e. Improper identification of an aid to navigation.

   f. Failure to utilize a chart or maintain a plot.

3. Advances in Electronic Charting Systems (ECS) have revolutionized boat navigation. GPS and ECS equipment display real time data with a high degree of accuracy. This gives the coxswain a perpetual fix enabling the coxswain to quickly determine the boat's position and orientation to their immediate surroundings. However, the use of ECS is not a total replacement for paper charts.

B. Purpose.

1. Definitions. This section contains definitions that have specific meanings unique to this chapter.

2. Command Responsibilities. This section outlines specific responsibilities for each key member of the command structure.

3. Command Navigation Standards. This section outlines the minimum information required for inclusion in the command navigation standards.

4. Navigation Requirements. This section states the minimum requirements for safe navigation.

5. Non-standard Boat (NSB) Operations. This section discusses the navigation requirements for Non-standard Boats.

C. Definitions.

1. Navigational Zones - The following two types of navigation zones are to be used during shore based boat operations:

   a. Harbor and Near Coastal (restricted waters): Narrow canals, channels, rivers, estuaries, sounds, bays, harbor entrances, traffic schemes, and up to two miles from shore.

   b. Coastal and Offshore (open waters): Two miles or more from shore or other known hazard.

2. Electronic Chart System (ECS) - A navigational aid meeting the recommended standards established by the Radio Technical Commission for Maritime Services for displaying vessel position and relevant navigational and nautical chart information on an electrical display. "The Cap'n" is an example of a Coast Guard approved ECS that is commonly used. An ECS is a situational awareness tool and is neither equivalent to nor a replacement for paper charts.

3. Up-to-date chart - A chart that has been corrected through the latest available update issued by the cognizant hydrographic office and Coast Guard Local Notice to Mariners.

D. Command Responsibilities.

1. Commanding Officers/Officers in Charge (CO/OIC) shall:

   a. Develop and publish guidance for boat crews that outline key operating areas, principle navigation routes, established waypoints, and other important information necessary for safe and reliable navigation within the unit's Area of Responsibility (AOR). An example of unit level guidance is provided in enclosure (7).

   b. State the areas within the unit's AOR where boat crews shall conduct frequent area familiarization transits. These designated areas correlate to the semi-annual currency maintenance requirements of the Boat Crew Training Manual, COMDTINST M16114.9 (series)

   c. Identify specific areas within the unit's Area of Responsibility (AOR) that pose significant navigational or environmental risks to boats. The CO/OIC shall mitigate these risks by imposing specific operating restrictions such as speed limits, establishing safe operating distances from known hazards, increasing frequency of fixes, and restricting operating areas for specific boat types. Each unit shall maintain a chart on display in the operations/planning space that highlights known hazardous and special operating areas within the unit's AOR.

   d. Publish a list of ready charts for the unit's AOR that must remain on each boat, and be kept up-to-date.

   e. CO/OIC's of units conducting surf operations shall establish navigation and piloting requirements for use during surf operations (i.e. use of natural ranges, radar ranges, waypoints, etc.).

2. Coxswains:

   a. Ultimate responsibility for the safety of boat and crew (including safe navigation) rests with the coxswain.

   b. Coxswains shall permanently mark their paper charts with standard track-lines, courses, and turn bearings along established routes and waypoints.

   c. Coxswains shall ensure paper and electronic charts are up-to-date.

   d. The coxswain must know the advantages and limitations of all electronic navigation equipment available. The coxswain should become proficient with those onboard tools that act as quick references for safely determining the boat's current and projected position such as the cross track error, danger and turn ranges, minimum depth alarms, waypoint display on the radar, and best use of electronic bearing lines.

   e. The coxswain must hone the selection and use of ranges (natural and man made), and other basic reliable visual cues within their own AOR and practice their use during day and night area familiarization runs required for currency maintenance.

f. Coxswains transiting close to navigation hazards and shoals, or running during restricted visibility or darkness, shall operate the vessel with extreme caution, which may include:

(1) Reducing speed.

(2) Stopping to review the navigation picture.

(3) Utilizing navigational data such as soundings, danger ranges, or bearings to verify position.

(4) Coordinating the boat crew as a navigation team to specifically observe the compass heading, fathometer, radar, ECS, or otherwise augment the coxswain's navigational ability.

(5) Any time the coxswain is uncertain of his/her position, he/she shall stop all way, or anchor if necessary and fix the boat's position.

3. Boat Crews:

a. Boat piloting is very reliant on the team effort of the entire boat crew. Input from all members is needed by the coxswain for safe piloting. Boat crew involvement includes lookout reporting, helm watch, plotting, or use of onboard electronics. Unit training should strengthen confidence in these areas.

b. A significant amount of boat piloting occurs in familiar waters that hold known dangers. It is critical that all boat crewmembers maintain vigilance and provide timely feedback to the coxswain. Extra caution while piloting should be taken during long missions and during mission wrap-up as fatigue or reduced stress can lead to judgment errors and misidentification of important information.

E. Command Navigation Standards.

1. Commanding officers /officers-in-charge shall publish Command Navigation Standards to incorporate the navigation requirements in U. S. Coast Guard Regulations, COMDTINST M5000.3 (series) and this manual. Command Navigation Standards shall include:

a. List of AOR key waypoints.

b. Command definition of Harbor/Near Coastal waters and Coastal waters.

c. Standard navigation fix intervals and methods.

d. Underway navigation expectations.

e. Specific guidance concerning navigation in caution or danger areas.

F. Navigation Requirements:

1. General. Boat configuration, navigation equipment, controls, and space available for navigation work varies greatly. Some boat types or missions place them in distinctly hazardous areas. For these reasons, this instruction will provide procedural guidance based on boat type, equipment available, and area of operation. This must be adapted or considered when drafting the Command Navigation Standards as required by Chapter 2, Section E.

2. Fixes. One of the following criteria must be met in order to constitute a proper "fix" of reasonable accuracy:

   a. Electronic fix in the form of latitude and longitude from a GPS system plotted on a paper chart.

   b. Boat position as plotted by an ECS using GPS input and confirmed with either visual or radar information. (If equipped with ECS, the CO/OinC will determine, with regard to urgency of mission and platform, the necessity of recording the vessel's position on a up-to-date paper chart.).

   c. The intersection of two or more radar ranges from prominent points of land or fixed objects with a bearing spread of over 60 degrees.

   d. The intersection of two or more bearing lines from fixed objects.

   e. The boat's alignment along a range (established or natural) combined with a measured radar range to a prominent object.

   f. Intersection of Lines of Position (LOP's) from a radar bearing and range to a single fixed object. The radar is the only instrument that can give simultaneous range and bearing information to the same object. This is not an ideal fix, but is an acceptable option.

3. Estimated Position (EP). An EP is a DR position modified by additional information, which in itself is insufficient to establish a fix. All EPs shall be compared to charted depth of water, and other available navigation devices. The following criteria constitute an EP:

   a. Radar range and bearing information established from a single identified floating aid to navigation.

   b. Passing abeam of a fixed object or floating aid to navigation without an established radar range and bearing.

4. Harbor and Near Coastal: The coxswain must be able to ascertain the boat's position at all times with a high degree of accuracy. The frequency of establishing fixes or EP's in restricted waters is dependent on the proximity of shoals/hazards and the boat's speed over ground. In restricted waters, the position should be determined at least every 15 minutes. Fixes should become more frequent whenever the boat is operated in an unfamiliar area.

5. Coastal: GPS is the most efficient means of fixing position. Fixes may be timed to coincide with ops/position reporting to the operational commander (OPCON). Having the communications watch ashore re-plot the boats position serves as a back up for the boat's crew. This is especially critical during inclement weather. A DR plot shall be plotted for 30-minute intervals and adjusted as needed based on updated fix information or course changes. Fixes shall be obtained at 30-minute intervals. Fixes shall become more frequent whenever the coxswain is uncertain of the boat's position or is operating in an unfamiliar area.

6. Piloting Using ECS: An ECS can be used as a primary means of navigation while using approved up-to-date electronic charts. Since ECS automatically plots the boat's GPS position against an electronic chart, it is perhaps the most efficient navigation tool for a coxswain. Use of waypoints and routes further assist the coxswain in rapidly comparing the planned DR track with the actual track-line. The information presented is real time. The coxswain must continually verify the validity of the displayed position against other observations such as the radar, fathometer, visual ranges, and aids to navigation.

   a. The coxswain will carry a up-to-date paper chart onboard to be used as a visual reference while navigating with an ECS.

   b. The coxswain must remain wary of the shortcomings of ECS. These include:

      (1) Lack of updated aids to navigation (ATON) changes published in Local Notice to Mariners (LNTM).

      (2) Various scales that add or omit details.

      (3) The possibility of electronic lines covering or obscuring charted hazards.

      (4) No course adjustments for hazards.

      (5) The boat's advance/transfer that occurs as the ECS updates position.

   c. As with poor chart work on paper, improper inputs for waypoint positions will lead to improper track lines and other errors.

7. Piloting Using GPS: As the most popular navigation tool, the GPS provides the basic information of present position, course, and speed required by a coxswain for navigation. Proper mission planning or unit navigation standards ensure the coxswain makes the best use of waypoints entered into the GPS. The automatic calculations for course and times must be compared to a paper plot to verify accuracy of each. Though the GPS displays the boat's position, it must also be plotted in order to compare with charted references and hazards. Unit navigation standards and sortie preparation shall include command decisions regarding paper-plotting frequency. As with the ECS, GPS accuracy is subject to equipment faults but more often improper input of waypoint information or set up function can lead to significant errors in navigation.

8. Piloting Using Radar: The radar provides a visual navigation picture as well as hazards such as vessel traffic. Its information may be used in conjunction with other tools (ECS, GPS) to provide a complete situational picture.

9. Piloting Using Fathometer: While not an accurate means of navigation by itself, the soundings provided by the fathometer can help confirm the accuracy of other tools. It can be used to follow a fathom curve or as a warning to alert the crew. Since the greatest risk in navigation comes from grounding, the fathometer is considered essential and should be monitored at all times, especially when in the vicinity of shoal water.

G. Non-standard Boat (NSB) Operations.

1. Various types of NSB's are used to meet the diverse missions for which they are employed. Some NSB's are minimally equipped with navigation gear, which restricts the coxswain's ability to maintain an active navigation plot. Additional factors such as limited workspace and exposure to environmental conditions further restrict the coxswain's ability to maintain an active navigation plot. Boats operating at higher speeds must balance the accuracy of fixes or EP's against the anticipated dangers with consideration for advance, transfer, and set. A safe speed should always be observed especially when operating near shoal waters or hazards. At a minimum, the following provisions shall apply to NSB (does not include work/flood punts and ice skiffs) operations:

   a. Operational Commanders shall ensure that all NSB's have the capability to obtain a fix by electronic means (i.e. GPS (handheld or installed), radar, chart plotter, etc.).

   b. When operating NSB's, coxswains shall carry up-to-date paper charts with permanent standard track-lines, courses, and turn bearings along established routes and waypoints for immediate reference. These charts can be folded and must be immediately available for reference during underway missions.

HELM COMMANDS

This enclosure provides a list of commonly used helm commands and may be tailored as appropriate to meet the requirements of Chapter 1, Section C. Standard phraseology governing orders to the helmsman is required to ensure orders are understood and promptly executed. The helmsman shall repeat each command word-for-word and shall report when the ordered action is complete. The conning officer shall acknowledge the helmsman's responses with "VERY WELL".

COMMAND	ACTION
RIGHT (LEFT) STANDARD (FULL) RUDDER	Apply the ordered rudder. Standard rudder is the amount required to turn the ship on its standard tactical diameter. The rudder angle varies from ship to ship. Full rudder is normally the amount required for reduced tactical diameter.
RIGHT (LEFT) ## DEGREES RUDDER	Apply the ordered rudder. This order may be followed by a new course for the helmsman to steer, such as "STEADY ON COURSE 256" or another rudder command. If no course is specified the helmsman shall call out the heading at 10 degree increments, such as "PASSING 150, PASSING 160", until a course is ordered by the conning officer.
INCREASE YOUR RUDDER TO RIGHT (LEFT) ## DEGREES	Increase the rudder angle the amount specified to cause the ship to turn more rapidly. This order may be followed by a new course for the helmsman to steer or another rudder command. If no course is specified the helmsman shall call out the heading at 10 degree increments until a course is ordered by the conning officer.
EASE YOUR RUDDER/EASE YOUR RUDDER TO RIGHT (LEFT) ## DEGREES	Decrease the rudder angle by half the amount currently applied or by the amount ordered. This order may be followed by a new course for the helmsman to steer or another rudder command. If no course is specified the helmsman shall call out the heading at 10 degree increments until a course is ordered by the conning officer.
RUDDER AMIDSHIPS	Place the rudder at zero degrees.
MEET HER	Use the rudder as necessary to check the swing of the ship without steadying on any specific course.
STEADY, STEADY AS SHE GOES, STEADY ON COURSE ###	Steer the course on which the ship is currently headed or the ordered course. If the ship is turning and the command STEADY or STEADY AS SHE GOES is given, the helmsman notes the heading and brings the ship back to the heading. The helmsman should then reply "STEADY; COURSE ###".

COMMAND	ACTION
SHIFT YOUR RUDDER	Move the rudder to the same angle in the opposite direction from where it is currently ordered. This order may be given only when a specific rudder angle is in effect.
NOTHING TO THE RIGHT (LEFT) OF COURSE ###	Steer nothing to the right (left) of the course specified.
HOW'S YOUR RUDDER	This is a query from the conning officer to ascertain the current rudder placement. The helmsman replies, "MY RUDDER IS RIGHT(LEFT) ## DEGREES".
MARK YOUR HEAD	Respond "MARK ###". A command to the helmsman to state the heading of the ship at the moment the command was given.
COMMAND	The helmsman's response to the conning officer if he/she did not hear a command, misunderstood a command or believes a command is improper.
STEER ON	The helmsman steers on a range or object identified by the conning officer.

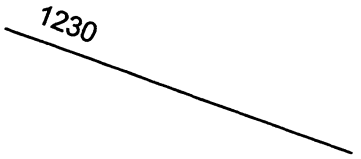
LINEHANDLING COMMANDS

This enclosure provides a list of standard linehandling commands and may be tailored as appropriate to meet the requirements of Chapter 1, Section C.

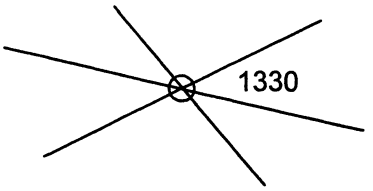
COMMAND	ACTION
PUT OVER/PASS (line number)	Pass the specified line to the pier and provide enough slack to allow linehandlers to place the line over the bitt, cleat or bollard.
HOLD (line number)	Do not let any more line out even though the risk of parting may exist.
CHECK (line number)	Hold heavy tension on the specified line but render it as necessary to prevent parting the line.
SURGE (line number)	Hold moderate tension on a line but render it enough to permit movement of the ship.
EASE (line number)	Let a line out until it is under less tension, but not slacked.
SLACK (line number)	Take all tension off a line and let it hang slack.
TAKE THE SLACK OUT OF (line number)	Take all the slack out of a line, but do not take a strain.
SHIFT (line number)	Shift a line to the specified location.
HEAVE AROUND ON (line number)	Take a strain on a line with the capstan.
TAKE (line number) TO POWER	Take the specified line to the capstan.
SINGLE UP (line number)	Take in all but one bight so there remains a single part to the line. May also be used to single up all normal mooring lines.
DOUBLE UP (line number)	Pass an additional bight on the specified line so there are three parts to the line. This may also be used to double up all normal mooring lines. Cutters without sufficient mooring line for three parts should just pass the bitter end of the single up to the pier.
AVAST or AVAST HEAVING	Stop taking a strain on a line with capstan.

COMMAND	ACTION
TAKE IN (line number)	Allow the pier linehandler enough slack to take the line off the fitting and bring the line aboard. Used when secured with your own line.
CAST OFF (line number)	When you are secured with another ship's lines, it means to cast off the ends of their lines.

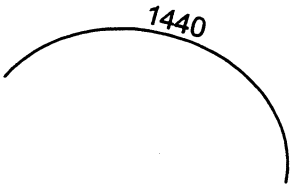
NAVIGATION PLOTTING SYMBOLS



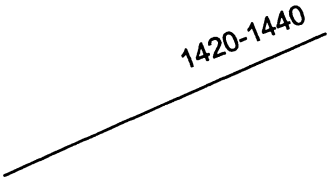
Single line of position
(Same for visual and electronic LOP)



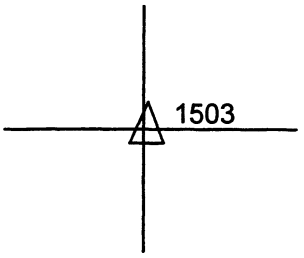
Visual fix



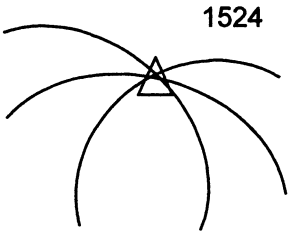
Distance arc or range



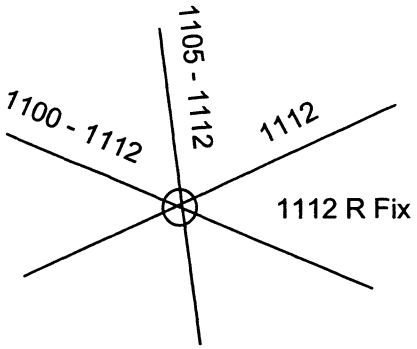
Advanced LOP
Original time and time LOP advanced to



Electronic fix



Electronic fix
using radar ranges



Running fix

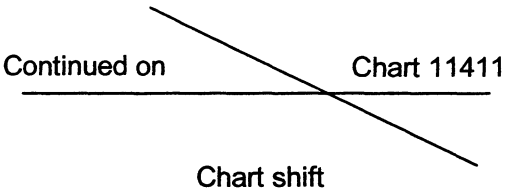
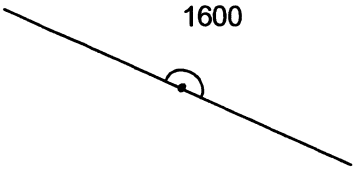
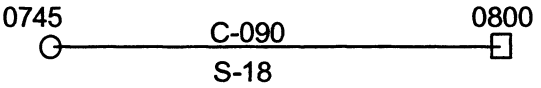


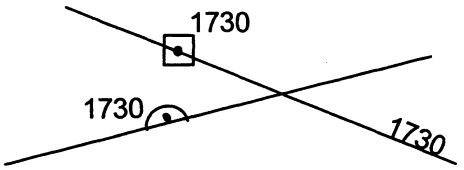
Chart shift



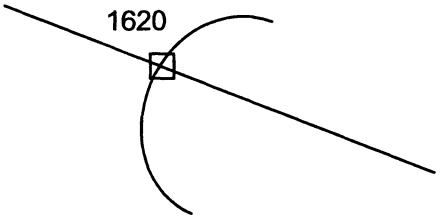
DR position.



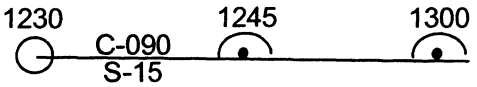
Actual course line
between a fix and an EP



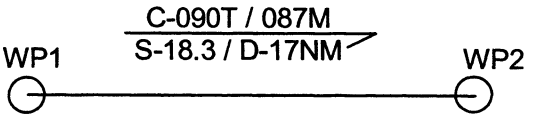
Estimated Position (EP) based
on DR position and single LOP



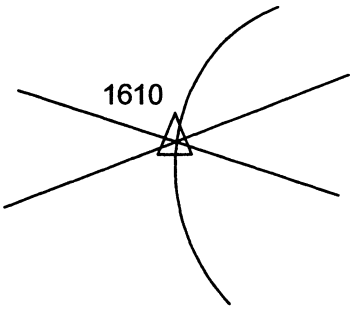
EP based on two LOPs.



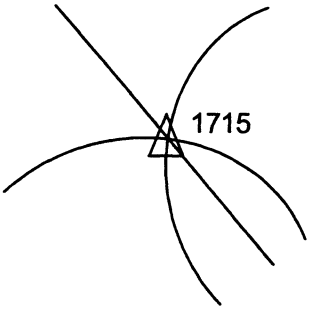
DR course line



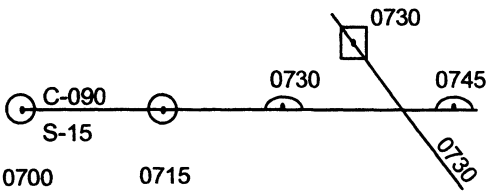
Trackline. Used between intended waypoints.

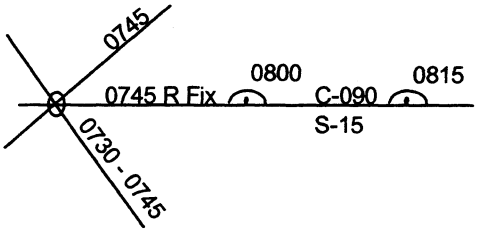


Two visual bearings and one radar range

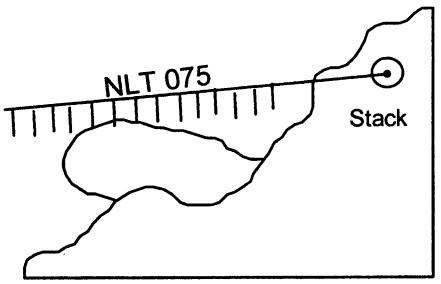


Two radar ranges and one visual bearing.

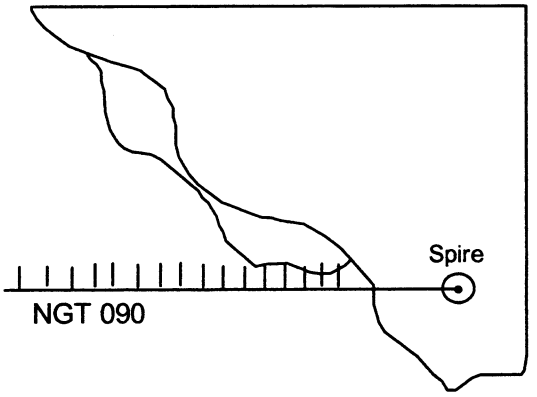




Examples of a DR course line with an EP and a DR course line with a running fix

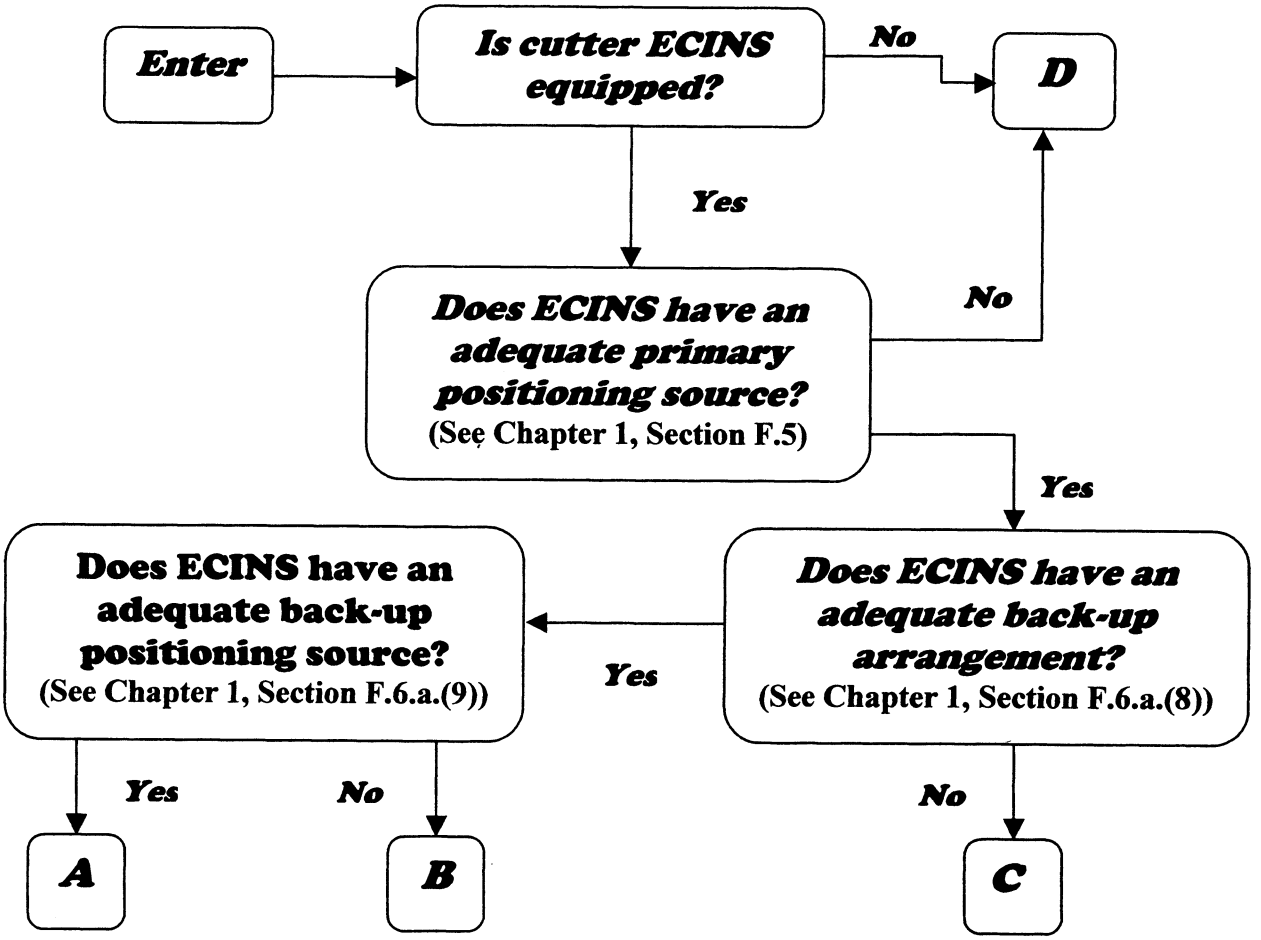


Danger bearing No Less Than 075 Deg T



Danger bearing No Greater Than 090 Deg T

PAPER CHART USAGE/MAINTENANCE REQUIREMENT FLOWCHART



A = Carry uncorrected paper chart. Use ECINS as primary means of navigation.

B = Carry uncorrected paper chart of the area. Use ECINS as primary means of navigation. Cutter shall correct and use paper charts in the event of positioning source failure.

C = Carry corrected paper chart of the area. Use ECINS as primary means of navigation.

D = Use corrected paper charts. ECINS/ECS (if so equipped) is to be used only as a situational awareness tool.

STANDARD GETTING UNDERWAY CHECKLIST

This enclosure provides a sample checklist containing common actions that must be taken prior to getting underway. This checklist may be tailored as appropriate to meet the requirements of Chapter 1, Section F.1.a.

Time prior to Getting Underway	Event
48 Hours	Establish getting underway schedule covering: propulsion plant light off, shift from shore to cutter power, disposal of cutter vehicles, light off and testing of electronic suite, U.S. and Guard Mail. Release MOVREP.
24 Hours	Conduct navigation brief Verify arrangements for tugs/pilots/linehandlers. Verify schedule for lighting-off power plant. Energize gyrocompasses. Check navigation lights for proper operation. Ascertain schedule of other vessel movements in harbor on underway day.
4 Hours	Energize all radars except those prohibited by local electromagnetic emissions restrictions. Validate DGPS/GPS datum. Reconfirm tugs/pilots/linehandlers. Verify arrangements for discontinuances of shore services.
2 Hours	Ascertain from the executive officer/executive petty officer any anticipated deviations from the Plan of the Day. Promulgate underway time to all hands. Energize and initialize all electronic navigation equipment. (Coordinate with shift from shore to cutter power.) Energize and calibrate all radar repeaters. (Post errors at each repeater and for navigation plotters.) Determine and post gyro, steering, and navigation repeater errors. Check/energize all other electronic equipment (e.g. fathometer, etc.). Conduct radio checks on all required circuits. (Include bridge-to-bridge radiotelephone)
1 Hour	Set condition Yoke. Tune and peak radars. Post tide/current/aids to navigation information on the bridge and CIC/CSC.

45 Minutes	Fix ship's position using all available positioning sources. Record draft of cutter fore and aft in cutter's deck log.
30 Minutes	Station the Special Sea Detail and Anchor Detail. In reduced visibility: 1. Station the low visibility detail. 2. Set material condition Zebra on main deck and below. Embark pilot. Display CODE HOTEL. Check steering in all available modes. Test sound-powered phone circuits in use. Receive department reports for readiness to get underway. Test anchor windlass. Prepare anchor(s) for letting go. OOD shift watch to the bridge.
15 Minutes	Obtain CO/OICs permission to shift to pilot house control (when equipped) and test main engine(s). Direct engineering control accordingly after ensuring that the screw(s) are clear. Test cutter's whistle/general alarms. Single up lines. Make SECURITE calls. Take in the brow and break all shore connections. Conduct time check. Report when "ready for getting underway" to the executive officer/executive petty officer.
10 Minutes	Warn engineering control to standby to answer all bells or of impending pilothouse control maneuvers.
Zero Time	Underway. Shift colors/close up international call sign (if appropriate). Make SECURITE calls. Report underway to VTS if appropriate.
After U/W	Return checklist to navigator for filing.

STANDARD ENTERING PORT/APPROACHING RESTRICTED WATERS CHECKLIST

This enclosure provides a sample checklist containing common actions that must be taken prior to Entering Port/Approaching Restricted Waters. This checklist may be tailored as appropriate to meet the requirements of Chapter 1, Section F.1.a.

Time prior to Entering Port/ Restricted Waters	Event
24 Hours	Conduct navigation brief.
3 Hours	Determine and post gyro, steering, and navigation repeater errors.
1 Hour	Pass the word, "Make all preparations for entering port. Cutter will anchor (berth _____ side to) at about _____. All hands shift into the Uniform of the Day." Lay out mooring lines if required. Set up and check all harbor and tug radio frequencies. Check into VTS when appropriate. Ascertain schedule of other vessel movements in harbor.
45 Minutes	Test cutter's whistle/general alarms. Station the Navigation Detail. Prior to approaching restricted waters, check steering in all available modes. Test backing bells. Hoist international call sign when entering inland waters (if applicable).
30 Minutes	Station the Special Sea Detail and Anchor Detail. Make anchor(s) ready for use. Inform the Anchor Detail of depth of water at anchorage, type of bottom, ready anchor, and scope of chain to be used. Inform first lieutenant as to range of tide and time of high water. Receive readiness reports for entering port. Make SECURITE calls. Request permission to enter port from the proper authority.
15 Minutes	If mooring to a buoy, lower boat with buoy detail as directed. Station linehandlers. Standby to receive tugs and pilots.
Upon Mooring	Secure main engines on _____ hour standby. Secure gyros and navigational radars as directed. Check out of VTS as appropriate.

If anchored, obtain navigation bearings and ranges, and determine swing and drag circles.
Record draft of cutter fore and aft.
Shift watch to quarterdeck.
Return checklist to navigator for filing.

UNIT LEVEL GUIDANCE FOR SHORE BASED BOATS

A. Unit preparations for navigation should:

1. Discuss coxswain's personal navigation kit (as supplement to the boat outfit).

2. Discuss creation of a master chart (known by various names, i.e. compass card) of the local area by each coxswain.

3. Discuss operations petty officer responsibility to maintain a master corrected paper chart for the unit and the need to provide a like copy to the Group Operations Center.

4. Discuss unit standardization of GPS waypoints that will be used and maintained on the unit boats.

5. List unit AOR key waypoints. Name or Description (LAT - LONG)

B. Unit qualification and certification should:

1. Discuss key operating areas frequented during normal unit operations. Relate them to the area familiarization requirements of the Boat Crew Training Manual, COMDTINST M16114.9 (series). Though currency maintenance may generically require only 1 day and 1 night "fam" trip each 6 months, the CO/OIC may specify increased trips in certain areas to reinforce knowledge necessary to safe navigation.

2. Discuss the local knowledge level relationships between all boat crew and communications watchstanders. Discuss the unit boat crew examining board and unit training program role in reinforcing thorough knowledge of these "key areas" as an important element in reducing risk (basis for Operational Risk Management (ORM), and principles of Team Coordination Training (TCT)).

C. Underway navigation expectations:

1. Prepare before launching if possible. Discuss expectations for pre-sortie navigation planning, plotting, and electronics input. This preplanning will reduce the underway work load, make immediate reference information available, establish waypoints that may be required for the sortie, and allow an opportunity to conduct ORM.

2. Discuss expectations for navigating in the key operating areas within the unit AOR. This would involve use of pre-established tracklines or operations within well-marked channels as the normal means of determining position verified by visual observations, GPS and/or radar. This encompasses the use of all-available information and tools. The coxswain must remain constantly cognizant of the boat's position and keep it in safe water and out of danger.

3. Discuss expectations for navigating outside the above listed key areas. This could involve requirements for an active plot maintained on a chart or with the electronic chart

plotter. This may be as simple as using Estimated Positions (EP's) as validation of the pre-planned DR tracks or as difficult as paper plotting of positions depending on circumstances. The coxswain must execute the proper level of team coordination to ensure safety and mission success.

4. Discuss navigation expectations in the surf environment. Surf operations are inherently dangerous so prudent use of ranges, depth sounder, sound seamanship, and teamwork is required. The heavy weather coxswain/surfman must use the electronic tools and visual cues available to determine the boat's current position with verifiable accuracy. They must also accurately recognize the effects of leeway, swell, and current on relative boat movement making proper compensation to allow for a safe transit. This must often be accomplished without additional paper plotting.

5. Discuss boat to shore communications as it might relate to navigation. The navigation demands on the boat crew may be tempered through prudent teamwork with shoreside assets (tower, beach party, vehicle).

6. Discuss operations at night or during periods of restricted visibility.

7. Whenever the position of the boat is in question or the information available is conflicting, discuss the immediate prudent measures to resolve. Normally, this will involve a reduction in speed, station keeping or anchoring long enough to get an accurate plotted fix.

D. Caution or danger areas:

1. Describe areas that pose significant dangers to a boat. A command may direct coxswains to avoid transit in these areas if not necessary to the sortie and always use extreme caution in piloting when operations require work nearby.

2. Describe areas where unit boats must adhere to no wake zones or speed limits during operations. It is typical that unit boats will observe the no wake requirement as well as take extra caution to lower speed and wake near marina entrances and in areas with high-density traffic. A command may remind coxswains to conduct normal operations or transits at cruising speed (xxxx RPM).

3. Discuss operating in areas of hazards or increased risks (wash rocks, crab pots, low visibility etc.).

4. Describe areas where known communications gaps exist in the area of responsibility. Command may require alternatives to operations and position reports when missions take boats into those areas to ensure safety.