K/S SS/AO/KC/AE/ESG/DDAK/SUBA/MHD/OPS(R) NAV

1 of 2 Ships Off
5 of 2 OPS

DEPARTMENT OF THE NAVY
COMMANDER NAVAL SURFACE FORCE
UNITED STATES PACIFIC FLEET
SAN DIEGO, CALIFORNIA 92155-5035

COMNAVSURFPACINST 1410.1
Code N612/NPC 334
08 January 1987

COMNAVSURFPAC INSTRUCTION 1410.1

Subj: PERSONNEL QUALIFICATION STANDARDS (PQS)

Ref: (a) OPNAVINST 3120.32A

Encl: (1) Qualification and Advancement Plan
(2) PQS Command Inspection Guide

1. Purpose. To promulgate the Personnel Qualification Standard (PQS) instruction of Commander Naval Surface Force, U.S. Pacific Fleet and establish uniformity throughout the Force in the preparation, management and execution of a PQS program.

2. Cancellation. COMNAVSURFPACINST 1500.3D, Chapter 4. This instruction is intended for use as the ship's PQS instruction.

3. General. The Personnel Qualification Standard is a document which describes the knowledge and skills an individual must demonstrate to perform his duties. PQS is a method of qualifying personnel to perform assigned duties. PQS is a qualification system, not a training one. Since an individual must be trained in order to qualify, the ship's training program must support PQS. The following features of the PQS program make it particularly useful to trainees and supervisors:

a. It identifies references where the trainee can find needed information.

b. It assigns responsibility for learning to the trainee and encourages self-achievement.

c. It provides the individual with a basic core of knowledge and skills which allows him to transfer to a new ship and assume his assigned duties with a minimum of requalification effort.

d. It provides supervisors with a record of accomplishment to facilitate monitoring progress and performance.

e. Standard answer books are being prepared by NAVEDTRASUPPCEN for most PQS and will be distributed as they become available.

4. Policy

a. It is important to emphasize that damage control is an "all hands" responsibility. Damage Control PQS will be accomplished on a priority basis. To this end the following are mandatory:

(1) Basic Damage Control PQS Section 2 shall be completed by all ship's officer and enlisted personnel, except officers completing the damage control portion of SWO PQS. The goal is for all personnel to complete Basic Damage Control PQS within six months of reporting aboard.

(2) Advanced Damage Control PQS shall be completed to the appropriate level by all personnel assigned to repair parties.

b. 3-M System PQS shall be completed to the appropriate level by all ship's force personnel (except officers completing 3-M portion of SWO PQS). The goal is for all personnel to complete the 3-M PQS to the appropriate level within twelve months of reporting aboard.

c. To help reduce the incidence of boiler explosions, fireroom watch station progression for conventionally fired steam ships is to be altered. The burnerman watch station is to be attained after all others except BTOW, Console Operator, and the main feed pump watch station.

d. The PQS Manager's Guide (NAVEDTRA 43100-1 Series) provides guidance for the implementation, organization and management of the PQS program.

Certified True Copy
[illegible]
AUTH: 10 USC 936 (a) (1)

ENCLOSURE 1
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e. Interim qualification may be granted by the Commanding Officer on an individual basis. Interim qualifications are temporary in nature and should not be a normal step enroute to final qualification.

5. PQS External Qualification. The PQS duties of key NAVSURFPAC organizations follow:

a. Group/Unit Commanders shall:

(1) Assign duties of unit PQS coordinator to an officer of his staff.

(2) Direct, monitor and evaluate the implementation and effectiveness of PQS in all assigned ships and operating units.

(3) Provide personnel from assigned subordinate ships to participate in PQS development workshops when directed by the TYCOM.

(4) Submit recommendations for the development of new PQS, as desired, via the chain of command.

(5) Conduct formal PQS inspections once per competitive cycle as part of the command inspection program, recommend enclosure (2) be utilized.

b. OIC Tender PQS Assist Teams shall provide PQS assist visits to ships and assistance to group/unit commanders as requested.

6. Shipboard PQS Organization. Duties of key personnel in the shipboard PQS organization are as follows:

a. Commanding Officer shall:

(1) Establish a PQS Organization

(2) Utilize tender PQS assist teams as needed.

(3) Act as final qualification authority for key watchstations.

b. Executive Officer shall:

(1) Act as overall PQS supervisor.

(2) Monitor Officer PQS progress at least monthly with the Senior Watch Officer.

c. Training Officer (PQS Coordinator) shall:

(1) Supervise implementation and execution of PQS as part of the command's training program.

(2) Advise Planning Board for Training on all PQS matters.

(3) Distribute PQS Directives and Software Standards, Progress charts, etc.).

d. Planning Board for Training shall:

(1) Assist the command in formulating training/PQS policy.

(2) Schedule lectures in support of PQS.

e. Senior Watch Officer shall:

(1) Indoctrinate newly reporting officer personnel in the command's PQS program.

(2) Assign officer qualification goals, monitor their progress and counsel individual officers on their progress and accomplishment.

(3) Maintain PQS progress records for SWO trainees.

(4) Brief the executive officer at least monthly on progress of officer trainees.

(5) Recommend officer qualifications to the commanding officer via the executive officer.

f. Head of Department shall:

(1) Monitor department PQS program.

(2) Act as final qualification authority for the department unless reserved by Commanding Officer.

(3) Designate individuals to serve as qualification petty officers/officers.

(4) Coordinate with division officers, cognizant chief petty officers, and leading petty officers, the watch station qualifications and advancement goals of the enlisted personnel assigned to the department.

(5) Recommend interim qualification of watchstanders, if necessary.

(6) Approve the division's recommendations for tailoring PQS Standards and standard answers.

g. Division Officer shall:

(1) Supervise division PQS program.

(2) Assign watch station PQS

(3) Recommend watch station PQS goals to each man in the division.

(4) Ensure entry of qualifications in trainee's service records prior to his transfer from ship.

(5) Recommend to head of department individuals for designation as Qualification Petty Officers.

(6) Recommend to head of department any required tailoring of PQS standards and standard answers.

(7) Brief the head of department at least monthly on progress of division personnel.

(8) Maintain and update periodically PQS progress records for division personnel.

h. Chief Petty Officer/Leading Petty Officer/Work Center Supervisor shall:

(1) Recommend watch station goals to division officer.

(2) On a weekly basis, monitor the progress of division personnel toward PQS goals as shown on the PQS progress records and conduct individual counseling as necessary.

(3) Recommend to the division officer any required tailoring of PQS Standards.

(4) Supervise Qualification Petty Officers within the division.

i. Qualification Petty Officers shall:

(1) Keep abreast of revisions/changes to equipment, systems and policies that affect assigned areas of responsibility.

(2) Recommend changes or required tailoring of PQS Standards to supervisors.

(3) Be available to sign off PQS and assist trainees as needed.

(4) Maintain PQS program integrity.

j. Trainee shall participate in training as assigned.

7. PQS Management and Administration. The ship's PQS program should support minimum watch station manning requirements projected six months into the future.

a. Individual PQS Accomplishment. A program for watch station qualification and advancement must be established for each newly reporting individual. This program must be tailored to the individual and should be the result of coordination among the department head, division officer, chief petty officer, leading petty officer and work center supervisor. Once established, the goals must be made known to the individual concerned. A format similar to that contained in enclosure (1) can be used to document individual goals. Upon reporting to a department after shipboard indoctrination, the following procedure is recommended:

(1) Initial interview by department head, assignment to a division, brief orientation tour of spaces.

(2) Second interview by Division Officer, issue PQS materials, assign specific watch station and advancement goals.

(3) Indoctrination into watch qualification process (progress charts, qualification petty officers, references, etc.).

b. Interim Qualification. To qualify a watchstander on an interim basis, the department head should comply with the following procedures:

(1) Identify specific PQS items to be accomplished by the individual.

(2) Upon accomplishment of required PQS, administer oral/written examination to determine if a satisfactory knowledge level of watch station requirements has been attained.

(3) Determine a deadline date by which the individual must achieve his final qualification or lose his interim qualification.

(4) Head of department recommends to the commanding officer that an individual be granted interim qualification for a specific watch station. Accompanying this recommendation should be an accurate appraisal of those PQS items and other qualification requirements which have been deferred. Notation of the interim qualification will be made in PQS progress on records and appropriate watchbills.

(5) During interim qualification period, ensure individual continues progress towards completion of final qualification.

c. Grace Period. The grace period is that period of time, upon the command's initial implementation of a PQS program, or a new Standard, when it is necessary to carry out the PQS program without PQS qualified personnel to serve as Qualification Petty Officers. During the grace period the following procedure should be followed:

(1) Determine the length of the grace period during a supervisory meeting held prior to introduction of the program to the crew. The length should be sufficient to allow personnel to become fully qualified to serve as Qualification Petty Officers/Officers. Experienced personnel should possess most of the knowledge and skills required by the PQS, therefore, the grace period should not take an excessive amount of time.

(2) Determine the most experienced, best qualified personnel to serve as initial qualifiers for each PQS requirement and designate them as initial Qualification Petty Officers/Officers for that specific standard. The collective knowledge, and assignment, of these initial qualifers should be sufficient to sign off all PQS requirements and certify final qualification of the trainees.

(3) As trainees become fully qualified, designate them as Qualification Petty Officers/Officers for the standard and remove the designation of the initial collective body of qualifiers once all watch stations have Qualification Petty

Officer/Officers assigned. This must be achieved prior to the end of the grace period.

d. Completion Requirements. As an individual completes a PQS watchstation and is subsequently qualified, it is suggested that the achievement be formally noted in some way perhaps at division quarters or commanding officer's inspection. In addition, the qualification shall be recorded on page 4 of the individual's service record prior to his transfer from the command. Individual letters of PQS watchstation qualification are not required as long as an individual's qualification status (final or interim) is reflected on unit watchbills and notes in PQS progress records.

(1) The signature pages of each completed qualification card may be utilized as desired. It is suggested that they be retained by the individual.

e. PQS Management Tools. The following PQS management tools are available through the supply system:

(1) NAVEDTRA 43100-1B, PQS Manager's Guide (FSN: 0501-LP-221-0012). This publication, although not a directive, contains suggested procedures for implementing and administering PQS programs. It's use is recommended.

(2) CNET Notice 3500. This notice, which is updated periodically, contains the names and Federal Stock Numbers (FSNs) of all available PQS materials. NAVSUP P-2002 also lists available PQS materials.

(3) Personnel Qualification Standards and Qualification Cards. These are the tools used to determine and certify qualification requirements. Signatures are required on qualification cards for each item. Qualification Standards and cards may be tailored by ships as desired to conform to individual ship configurations. Qualification Standards and Qualification Cards are available through the supply system by ordering direct from Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Ensure the supply department is aware of the requirement to order from this source. Ordering through the normal supply system (other than direct from Philadelphia) will probably result in a cancelled or "Not in Stock" (NIS) returned requisition.

f. PQS Progress Record. Records used to document and monitor individual PQS progress may be maintained in any one of the following formats:

(1) PQS Progress Charts (FSN: 0115-00-025-0010). These forms are stocked at Naval Publications and Forms Center, Philadelphia, NSC Norfolk, NSC San Diego, and NSD Subic Bay. Appendix A of NAVEDTRA 43100-1B (PQS Managers Guide) contains detailed guidance on use of PQS Progress Charts.

(2) PQS Qualification and Advancement Plan

(3) Division Officers Notebook

(4) Commands having ADP capability may track individual's PQS progress by automated means.

8. Tender PQS Assist Teams

a. Assistance to ships and group/unit commanders in implementing PQS and evaluating shipboard PQS programs may be necessary. To this end, NAVSURFPAC tenders and repair ships will maintain PQS Assist Teams. In the absence of a tender/repair ship, the local IMA or type commander staff will maintain assistance teams.

b. Tenders, Repair Ships and designated activities will maintain a minimum of two PQS assist teams made up of at least three personnel each. Personnel assigned to PQS assist teams should be experienced and well versed in PQS procedures including the use of the SNAP II computer PQS menus. An officer or chief petty officer will be assigned as Officer-in-Charge of the teams.

c. PQS Assist Teams will perform the following functions:

(1) Conduct implementation or assist visits

(2) Assist group/unit commanders as requested in assessing ship PQS programs.

d. Ships may request assist or implementation visits by work request. Unit/group commanders request assessment assistance from PQS assist teams by message or letter.

9. Surface Warfare Officer (SWO) PQS. Procedures and guidelines to be followed in the SWO qualification process are promulgated in OPNAVINST 1412.2D and MILPERSMAN Article 141270. Within NAVSURFPAC, steady progress towards attainment of SWO qualification within twenty-four months is a primary responsibility of all 116X officers.

a. Action

(1) Commanding officers of all commissioned ships shall:

(a) Ensure all 116X officers have been provided with a complete SWO PQS package.

(b) Re-evaluate the established goals when an officer is not attaining his planned progress in order to identify the cause and determine a revised plan of action.

(c) Convene Surface Warfare Officer Qualification boards.

(2) Officers pursuing designation as a Surface Warfare Officer shall:

(a) Meet all requirements specified in OPNAVINST 1412.2D.

(b) Maintain steady progress towards achievement of qualification within twenty-four months of reporting to sea duty.

(c) Place emphasis on early completion of the 3-M and DC portions of the PQS. Completion of NAVEDTRA 43119-2B (General Damage Control PQS) and NAVEDTRA 43119-2B 43241C (3-M System PQS) will not be required of those officers pursuing designation as a Surface Warfare Officer. Commanding officers may grant SWO PQS equivalencies to those officers who have previously completed the referenced DC and 3-M PQS.

b. Recognition. Attainment of SWO designation should be given suitable command recognition in an appropriate ceremony, including presentation of the SWO insignia and qualification certificate (OPNAV Form 4/1 #0107-LF-014-1205).

10. Enlisted Surface Warfare Specialist Qualification Program. OPNAV Instruction 1414.1 establishes the Enlisted Surface Warfare Specialist (ESWS) qualification program.

a. Action. Qualification as an ESWS is a voluntary action. Commanding Officers should encourage petty officers under their command to participate in the qualification program. Personnel achieving ESWS qualification should be formally recognized in an appropriate ceremony, including presentation of the ESWS insignia and qualification certificate (OPNAV Form 14/2 #0107-LF-014-1210).

S. S. CLAREY
Deputy and
Chief of Staff

Distribution:
SNDL Parts 1 and 2
26A2 Amphibious Group PAC
26C2 Beach Group PAC
26D2 SEAL Team and SEAL Delivery Vehicle Team PAC
26E2 Amphibious Unit PAC
26U2 Surface Force Pacific Readiness Support Group
26V2 Landing Force Training Command PAC
26Z2 Shore Intermediate Maintenance Activity PAC
26DD2 Mobile Diving and Salvage and Consolidated Units PAC

26FF	Mine Warfare Inspection Group
26GG2	Explosive Ordnance Disposal Group and Unit PAC
26QQ2	Special Warfare Group and Unit PAC
26000	Mobile Training Team
28B2	Cruiser-Destroyer Group PAC
28C2	Surface Group and Force Representative PAC
28D2	Destroyer Squadron PAC
28E2	Surface Squadron PAC
28G2	Mine Group and Division PAC
28I2	Craft of Opportunity Mine Squadron and Unit PAC (COOPMINERON 11 only)
28J2	Service Group and Squadron PAC
28L2	Amphibious Squadron PAC
29A2	Guided Missile Cruiser PAC (CG) (CGN)
29E2	Destroyer PAC (DD), 963 Class
29F2	Guided Missile Destroyer PAC (DDG)
29G2	Guided Missile Frigate PAC (FFG)
29H2	Frigate PAC (FF), less 1040/1097 Class
29J2	Frigate PAC (FF), 1040/1051 Class
29K2	Frigate PAC (FF), 1052/1077 Class
29L2	Frigate PAC (FF), 1078/1097 Class
29R2	Battleships PAC (BB)
29AA2	Guided Missile Frigate PAC (FFG), and Fleet Introduction Team
29BB2	Guided Missile Destroyer (DDG) 993 Class PAC
30A2	Minesweeper, Ocean (Non-magnetic), PAC (MSO)
31A2	Amphibious Command Ship PAC (LCC)
31B2	Amphibious Cargo Ship PAC (LKA)
31G2	Amphibious Transport Dock PAC (LPD)
31H2	Amphibious Assault Ship PAC (LHA) (LPH)
31I2	Dock Landing Ship PAC (LSD)
31J2	Dock Landing Ship PAC (LSD)
31M2	Tank Landing Ship PAC (LST)
32A2	Destroyer Tender PAC (AD)
32C2	Ammunition Ship PAC (AE)
32G2	Combat Store Ship PAC (AFS)
32H2	Fast Combat Support Ship PAC (AOE)
32N2	Oiler PAC (AO)
32Q2	Replenishment Oiler PAC (AOR)
32S2	Repair Ship PAC (AR)
32X2	Salvage Ship PAC (ARS)
32KK	Miscellaneous Command Ship PAC (AGF)
32QQ2	Salvage and Rescue Ship PAC (ATS)
36A2	Auxiliary Repair Dry Dock (ARD) (AFDM), PAC (STEADFAST only)
39E2	Amphibious Construction Battalion PAC
42T2	Tactical Air Control Group and Squadron PAC (VTC)
42KK	Lamps MK III/SH-60 Fleet Introduction Team (FIT)
C58B	Surface Warfare Officers School Command Detachment
FB21	Amphibious Base PAC
FT35	Amphibious School (Coronado only)
FT43	Surface Warfare Officers School Command
OIC MOTRATEAM MIDPAC	

COMNAVSURFPACINST 1410.1
08 January 1987

QUALIFICATION AND ADVANCEMENT PLAN FOR

_____
NAME/RANK

Indoctrination Date _____
Interviewer _____

1. General Info:

_____
_____
_____
_____

2. Specific assignments, desired completion dates:

a. Watchstation Qualification Assignments:

Watchstation	Weekly/Monthly PQS PTS/PCT	Completion Date
(1)		
(2)		
(3)		
(4)		
(5)		
(6)		

b. Advancement requirements: (Ensure changed with each advancement)

(1) Present Grade ____ Time reqmt to next ____ Approx elig _____

(2) Correspondence requirements Desired completion date

(3) Examination requirements: (FN/SN, MIL LDRSHIP, PO3, 2, 1, C, date elig:)

Examination _____ Elig Date _____

c. Schools (Type and expected date to obtain quota)

Name/Number	Expected Date

Acknowledged _____ _____

(a) Date _____

Remarks:

_____
_____
_____
_____
_____

_____
SIGNATURE

(b) Date _____

Remarks:

_____

SIGNATURE

(c) Date _____

Remarks:

_____

SIGNATURE

(d) Date _____

Remarks:

_____

SIGNATURE

Copy to: (Keep original in D. O. Files)
Trainee
Work Center Supervisor

POS COMMAND INSPECTION GUIDE

1. Command Administration

a. To evaluate if the ship has a viable and effective PQS Program. (20 points)

EVALUATION FACTORS:

(1) Ship's PBFT actively involved in coordinating and regularly scheduling PQS training.

(2) PQS administration is complete and up-to-date.

(3) Newly reporting personnel introduced to PQS program and procedures and assigned qualification goals.

(4) Qualification boards established to administer oral or written exams for final qualifications when required.

(5) Supervision of the qualification process supports a high degree of quality in PQS accomplishment.

COMMAND ADMINISTRATION TOTAL POINTS:

2. Department/Division/Work Center Administration

a. To evaluate if the PQS installation has been effectively implemented within ship's departments. (20 points)

EVALUATION FACTORS:

(1) Departmental manning and qualification status projected for six months is/is not sufficient to support minimum watchstanding requirements.

(2) Supervisors and watchstanders are making adequate progress towards goals.

(3) Non-qualified or insufficiently qualified personnel are not being assigned to PQS covered watchstation or other PQS covered duties.

(4) Type commanders goals for PQS qualification in following areas being met:

(a) DC PQS (within six months)

(b) 3M PQS (within twelve months)

(c) CBR PQS (within twelve months)

3. Program Effectiveness

a. To determine if PQS qualified personnel are in fact sufficiently trained to perform assigned watchstander functions.

EVALUATION POINTS: (60 points maximum)
(10 points per individual)

(1) Randomly interview six personnel to evaluate their profiency at watchstations that they have been qualified at in accordance with PQS.

INDIVIDUAL	WATCHSTATIONS	POINTS AWARDED
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

PROGRAM EFFECTIVENESS TOTAL POINTS: _____

Evaluation methodology is at discretion of the inspector but should be sufficient to reasonably ascertain the validity of an individuals PQS qualification. It is suggested that the interview include an oral or written examination of the watchstations knowledge of PQS subject matter in basic fundamentals and procedures needed to do the job properly. A practical demonstration of watch or work station tasks should conclude the interview.

COMMANDER FLEET TRAINING GROUP

NAVIGATION FINAL REPORT ADDENDUM
CFTG FORM NO. 6430002A (JAN 89)

USS/~~USCGC~~ KINKAID (DD-965) DATE 15 MAR 89

1. Summary of exercises conducted:

EXERCISE	NAME	REQ	CON	SAT	SCORE				
MOB-N-001-SF	EW Navigation	1	1	1	100				
MOB-N-002-SF	Open Ocean Nav	1	1	1	100				
MOB-N-003-SF	Secondary Conn	–	–	–	–	–	–	–	–
MOB-N-004-SF	Gyro Piloting	2	3	3	96	96	91		
MOB-N-005-SF	Precision Anchor	2	4	4	98	100	87	89	
MOB-N-006-SF	Low Visibility	2	2	2	95	97			
MOB-N-007-SF	Loss of Gyro	2	4	4	94	88	95	81	
MOB-N-008-SF	Swept Channel	2	3	3	86	89	89		
	TOTAL	12	18	18					

2. Training Assist Man-days: 08

3. STR's not conducted: N/A

4. Remarks:

a. Preparations: SAT – NAVIGATION TEAM 100% PREPARED FOR ALL EXERCISES CONDUCTED.

b. Training: OUTSTANDING – NAVIGATION TEAM WAS ABLE TO PERFORM IN AN ABOVE AVERAGE MANNER, EVEN WHEN THE QMC WAS REMOVED FROM THE SCENE. MOST JUNIOR QUALIFIED QMOW, A QM3; HAD A THOROUGH UNDERSTANDING OF CELESTIAL NAVIGATION.

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ENCLOSURE (1)

COMMANDER FLEET TRAINING GROUP

NAVIGATION FINAL REPORT ADDENDUM
CFTG FORM NO. 6430002A (JAN 89)

c. Execution: OUTSTANDING - NAVIGATION TEAM PERFORMED IN AN OUTSTANDING MANNER DURING ALL FACETS OF MARINE NAVIGATION. WHEN 2ND TEAM UTILIZED, GRADES SLIPPED FROM OUTSTANDING TO HIGH SAT. MORE ATTENTION TO DETAIL BY 2ND TEAM WILL INSURE OUTSTANDING PERFORMANCE IN THE FUTURE.

d. Degaussing: → SAT

5. Recommendations: RUN ALL NAVIGATION STA'S AT EVERY OPPORTUNITY, SHIFTING PERSONNEL AROUND REGULARLY. HAVE JUNIOR PERSONNEL PRACTICE IN CELESTIAL NAVIGATION EACH UNDERWAY PERIOD. (WEATHER PERMITTING) HOLD REGULAR NAV TEAM TRAINING WITH CIC- TION OF NAV TEAM, INSURING PROPER PILOTING PROCEDURES ARE EMPHASIZED.

[signature], USN
INSTRUCTOR/OBSERVER

COMMANDER FLEET TRAINING GROUP

NAVIGATION TBP TR/A DEBRIEF FORM
FORM NO. 6430004A (JAN 89)

~~TRAINING BATTLE PROBLEM~~/TRAINING ASSESSMENT DEBRIEF

USS/~~USCGC~~ KINKAID (DD-965) DATE: 15 MAR 89

1. Recommended grade: OUTSTANDING (96)

2. Preparations: SAT/UNSAT SAT - NAV TEAM 100% PREPARED FOR ALL EXERCISES.

3. Organization: OUTSTANDING - NAV TEAM ABLE TO FUNCTION IN AN ABOVE AVERAGE MANNER WITHOUT QMC. QM2 B-6. DID AN OUTSTANDING JOB FILLING IN FOR THE CHIEF.

4. Communications between Navigator-CIC-OOD: SAT - COMMS USUALLY GOOD, ONLY OCCASIONALLY WEAK. NAVIGATOR MOST PROVED IN THIS AREA.

5. Battle dress/missile hazards: SAT - NO DISCREPANCIES NOTED.

6. CIC's support of the navigation picture: SAT - CIC NAV PLOT NEEDS TO WORK ON MAINTAINING A DR TRACK.

7. Navigation Team Evaluation:

a. Harbor navigation: OUTSTANDING - NAV TEAM ABLE TO FUNCTION IN AN OUTSTANDING MANNER IN ALL FACETS OF HARBOR NAV. WHEN 2ND STRING BRIDGE NAV TEAM IN PLACE, A LITTLE MORE ATTENTION TO DETAIL IS REQUIRED. NAVIGATOR'S EVALUATION OF PLOT APPROACHING OUTSTANDING.

COMMANDER FLEET TRAINING GROUP

NAVIGATION TBP TR/A DEBRIEF FORM
CFTG FORM NO. **6430004A** (JAN 89)

b. Coastal Navigation: OUTSTANDING - ALL BRIDGE WATCH STANDERS EXTREMELY KNOWLEDGEABLE OF THEIR DUTIES, AND STOOD PROFESSIONAL WATCHES.

c. Open ocean navigation: OUTSTANDING - OUTSTANDING KNOWLEDGE OF CELESTIAL NAVIGATION DOWN TO QM3 TY'S !.

8. Degaussing runs: SAT/UNSAT SAT

9. Recommendations: RUN NAV STR'S AT EVERY OPPORTUNITY. PRACTICE CELESTIAL NAVIGATION, WEATHER PERMITTING, EACH UNDERWAY PERIOD, UTILIZING AS JUNIOR PERSONNEL AS POSSIBLE.

GENERAL COMMENTS - NAV DEPT HAS AN "OUTSTANDING" TRAINING PROGRAM DUE TO THE DILIGENT EFFORTS OF A CONSCIENTIOUS NAVIGATOR AND OMC. IT WAS A PLEASURE TO WORK WITH THIS NAV TEAM.

[redacted] LCDR IC(SW), USN
INSTRUCTOR/OBSERVER

COMMANDER FLEET TRAINING GROUP

QUICKLOOK/TRAINING COMPLETION REPORT
CFTG FORM NO. 6000024A (NOV 88)

USS/~~USCGC~~ KINKAID (DD-965) DATE 15 MAR 89

MISSION AREA NAVIGATION SENIOR INSTRUCTOR OMC(SW) TS-6

ADJECTIVE GRADE OUTSTANDING NUMERICAL GRADE 96

MATERIAL RELIABILITY SAT MANDAYS EXPENDED (TA/RFT) 08

STRs PROGRAMMED 12 STRs CONDUCTED 18 STRs SAT 18

EXERCISES INCOMPLETE (REASONS) NONE

EXERCISES UNSAT (REASONS) NONE

TRE DISCREPANCIES REMAINING NONE

ADDITIONAL COMMENTS MOB-N: OUTSTANDING - NAV TEAM'S PERFORMANCE WAS "OUTSTANDING" THROUGHOUT TRAINING PERIOD. NAV PERSONNEL EXHIBITED AN ABOVE AVERAGE KNOWLEDGE OF ALL ASPECTS OF MARINE NAVIGATION, INCLUDING CELESTIAL NAVIGATION KNOWHOW TO THE OM3 LEVEL. UPON REPLACING ORIGINAL NAV TEAM WITH SECOND TEAM, ABOVE AVERAGE RESULTS WERE CONTINUED. LPO EXTREMELY EFFECTIVE IN REPLACING OMC, UPON BECOMING A SIMULATED CASUALTY DURING THE TA. "OUTSTANDING" KNOWLEDGE LEVEL OF NAV PERSONNEL CONTRIBUTED TO THE DILIGENT TRAINING PROGRAM IMPLEMENTED BY A CONSCIENTIOUS NAVIGATOR AND OMC.

W.B. B-6
SECTION HEAD

COMMANDER FLEET TRAINING GROUP

MOB-N-7-SF LOSS OF GYRO PILOTING
CFTG Form No. 6430007S (JAN 89)

KINKAID (DD-965) DATE: 14 MAR 89

INSTRUCTOR: GMC(SW) TG-6 SCORE: (81) SAT

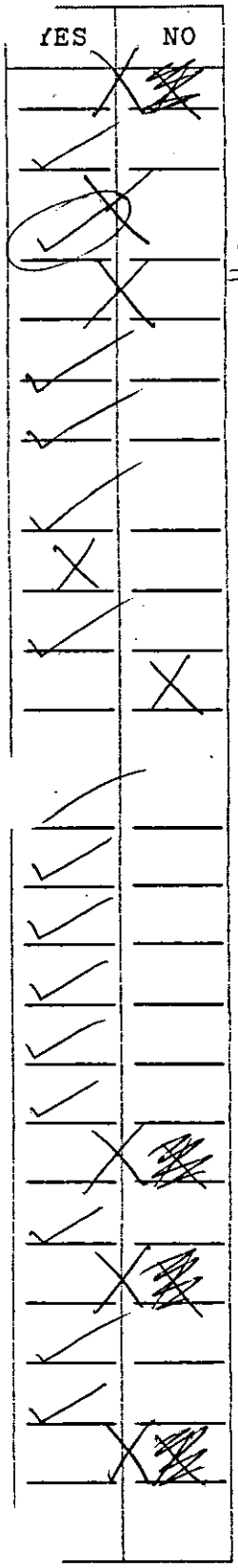
THIS EXERCISE WILL BE CONDUCTED IAW FXP-4, COMNAVSURFPACINST 3530.2B AND COMNAVSURFPAC/COMNAVAIRPACINST 3530.3A

==========

YES	NO	
✓		1. **EVALUATION**
		a. Bridge/CIC charts corrected and largest scale available for area.
		b. Charts prepared with:
✓		(1) Proposed track labeled with true and magnetic courses and distance of each leg.
✓		(2) Turn points based on ship's tactical data and labeled with bearing, range and speed/rudder combinations.
✓		(3) Shoal water for ship/isolated dangers highlighted.
✓		(4) Danger bearings and angles, as appropriate, where shoal water and dangers are not marked by NAVAIDS.
✓		(5) Chart shift points (Bridge and CIC shift points must differ by at least one fix interval).
✓		(6) Vertical clearance at high tide of overhead obstructions, e.g. bridges and powerlines.
		c. Gyro:
✓		(1) Gyro error determined within 24 hours of exercise, including benchmark alignment, and gyro repeaters checked against master gyro.
✓		(2) Cumulative error labeled on or adjacent to master gyro.
✓		(3) Cumulative error labeled on or adjacent to repeaters.
✓		(4) Individual repeater error and master gyro error recorded in Magnetic Compass Book.
		d. Radar:
✓		(1) Bearing and range error for each navigational radar repeater determined within 24 hours of exercise.
✓		(2) Error posted on or adjacent to the repeaters.

-10

YES	NO	
✓		(3) Radars tuned/peaked in all available pulse widths.
✓		(4) Event logged in the CIC Watch Log.
		e. Time check:
✓		(1) Shipwide time check conducted and clocks physically synchronized between Bridge, CIC, Main Control, and Conn.
✓		
		(2) Time check logged in the Deck Log.
		f. Tide and current:
	X	(1) Predictions determined/posted Bridge/CIC for each reference station/substation ship passed.
✓		(2) Computations entered in Navigational Workbook.
✓		g. Magnetic compass deviation tables posted at all conning stations, CIC and Bridge plotting tables.
✓		h. Ship's tactical data readily available for Conn, CIC and Navigator.
✓		i. Brief:
		(1) Navigational brief held prior to transit.
✓		(2) All members of navigational team, including CIC plotting team briefed.
✓		(3) Brief included contingency plans to allow for sudden changes in the transit plan.
		j. Fixes:
	X	(1) Fixes taken as piloting situation dictated but at least once every 3 minutes.
	X	(2) Time of fix labeled.
✓		(3) All fixes contained at least 3 LOPS.
	X	(4) DR laid out from each fix as far ahead as practical but at least 2 fix intervals, including beyond a turn.
	X	(5) DR labeled with course, speed, and times.



(6) Set and drift determined at least once every 3 fixes or once on short legs (500-1000 yards).

(7) CIC took fixes concurrently with Bridge.

(8) Reported directly to Navigator but audible for Conn and OOD to hear.

(9) Compared and results reported to Conn and CIC.

(10) Conn acknowledged the report.

(11) Accurate.

(12) Corrected for errors in radar repeaters, gyros, gyro repeaters and benchmark alignment.

(13) Greater than 50 yds from correct position.

(14) Problems resolved when inaccurate.

(15) Bridge and CIC within 25 yds.

k. Reports:

(1) Current, reflecting were the ship was.

(2) In order of priority.

(3) Time of fix information.

(4) Fix quality.

(5) Nearest hazard ahead of line of motion.

(6) Danger bearing pointed out to Conn.

(7) Depth of water compared to charted depth.

(8) Distance and clock time to turn.

(9) Set and drift.

(10) Relationship to track.

(11) Course and speed recommendation.

(12) CIC concurrence.

l. Course recommendations:

YES	NO	
	X	(1) Set and drift, advance and transfer and compass error taken into account.
✓		(2) New course searched by Bridge and CIC for dangers and shipping.
		m. Log keeping:
✓		(1) Deck Log.
✓		(2) Magnetic Compass Book.
	X	(3) Bridge-to-Bridge Radio Telephone.
✓		(4) Bearing Record Book.
		n. Turn bearings/turn ranges:
✓		(1) Reports given in "distance to turn".
✓		(2) Timely given to Conn.
✓		(3) Object physically pointed out to Conn.
✓		(4) Adjusted for being off proposed track.
		o. Communications between Conn, CIC and Navigator:
✓		(1) Piloting situation.
✓		(2) Course and speed.
✓		(3) Material condition effecting speed, steering or stability.
✓		(4) Intentions or deviations from proposed track.
✓		p. Conn used danger bearings/angles to keep clear of shoal waters.
✓		q. Bridge free of unnecessary noise.
		r. Navigator:
✓		(1) Directly supervise navigation team.
	✓	(2) Engrossed in one aspect of piloting to the detriment of the overall picture.
		s. XO:

MOB-N-7-SF LOSS OF GYRO PILOTING
CFTG Form No. 6430007S (JAN 89)

YES	NO	
✓		(1) Monitored the navigation team's performance.
✓		(2) Took corrective action on substandard performance.
		t. Lookouts/sound-powered phone talkers:
✓		(1) Fully qualified.
✓		(2) Information correlated with shipping/navigation picture.
✓		(3) Alerted to watch for upcoming contacts.
		u. CIC:
✓		(1) Surface plot maintained.
✓		(2) Shipping Officer and Navigator kept each other informed of the others situation.
✓		(3) Shipping Officer made recommendations to Conn.

COMMENTS:

MORE "ATTENTION TO DETAIL" REQUIRED BY NAV PLOT & NAV/CIC Comm Flow.

(QM3 HANDLES 3-ARM PROTRACTOR IN AN ABOVE AVERAGE MANNER.)

INSTRUCTOR/OBSERVER

COMMANDER FLEET TRAINING GROUP

MOB-N-5-SF PRECISION ANCHORAGE
CFTG Form No. 6430005S (JAN 89)

BRIDGE 92 | CIC 86

USS KINKAID (DD-965) DATE: 15 MAR 89

INSTRUCTOR: QMC(SW) TYE SCORE: (89) SAT

THIS EXERCISE WILL BE CONDUCTED IAW FXP-4, COMNAVSURFPACINST 3530.2B AND COMNAVSURFPAC/COMNAVAIRPACINST 3530.3A

YES	NO	
✓		1. **EVALUATION**
✓		a. Bridge/CIC charts corrected and largest scale available for area.
✓		b. Charts prepared with:
✓		(1) Proposed track labeled with true and magnetic courses and distance of each leg.
✓		(2) Turn points based on ship's tactical data and labeled with bearing, range and speed/rudder combinations.
✓		(3) Shoal water for ship/isolated dangers highlighted.
		(4) Danger bearings and angles, as appropriate, where shoal water and dangers are not marked by NAVAIDS.
✓		(5) Chart shift points (Bridge and CIC shift points must differ by at least one fix interval).
✓		(6) Vertical clearance at high tide of overhead obstructions, e.g. bridges and powerlines.
		c. Gyro:
✓		(1) Gyro error determined within 24 hours of exercise, including benchmark alignment, and gyro repeaters checked against master gyro.
✓		(2) Cumulative error labeled on or adjacent to master gyro.
✓		(3) Cumulative error labeled on/adjacent to repeaters.
✓		(4) Individual repeater error and master gyro error recorded in Magnetic Compass Book.
		d. Radar:
✓		(1) Bearing and range error for each navigational radar repeater determined and logged within 24 hours of exercise.

YES	NO	
✓		(2) Error posted on or adjacent to the repeaters.
✓		(3) Radars tuned/peaked in all available pulse widths.
	X	(4) Event logged in the CIC Watch Log.
		e. Time check:
✓		(1) Shipwide time check conducted and clocks physically synchronized between Bridge, CIC, Main Control, and Conn.
✓		(2) Time check logged in the Deck Log.
		f. Tide and current:
✓		(1) Predictions determined/posted Bridge/CIC for each reference station/substation ship passed.
✓		(2) Computations entered in Navigational Workbook.
✓		g. Magnetic compass deviation tables posted at all conning stations, CIC and Bridge plotting tables.
✓		h. Ship's tactical data readily available for Conn, CIC and Navigator.
		i. Brief:
✓		(1) Navigational brief held prior to transit.
✓		(2) All members of navigational team, including CIC plotting team briefed.
✓		(3) Brief included contingency plans to allow for sudden changes in the transit plan.
		j. Fixes:
X		(1) Fixes taken as piloting situation dictated but at least once every 3 minutes.
X		(2) Time of fix labeled.
X		(3) All fixes contained at least 3 LOPS.
X		(4) DR laid out from each fix as far ahead as practical but at least 2 fix intervals, including beyond a turn.

YES	NO	
	X	(5) DR labeled with course, speed, and times.
X		(6) Set and drift determined at least once every 3 fixes or once on short legs (500-1000 yards).
✓		(7) CIC took fixes concurrently with Bridge.
✓		(8) Reported directly to Navigator but audible for Conn and OOD to hear.
✓		(9) Compared and results reported to Conn and CIC.
✓		(10) Conn acknowledged the report.
✓		(11) Accurate.
✓		(12) Inside 1000 yds to the anchorage, distance and bearing provided every 30 sec.
✓		(13) Corrected for errors in radar repeaters, gyros, gyro repeaters and benchmark alignment.
	✓	(14) Greater than 50 yds from correct position.
✓		(15) Problems resolved when inaccurate.
	X	(16) Bridge and CIC within 25 yds.
✓		(17) Anchored within 100 yds of designated anchorage.
		k. Reports:
✓		(1) Current, reflecting were the ship was outside 1000 yards from the anchorage.
✓		(2) In order of priority.
✓		(3) Time of fix information.
✓		(4) Fix quality.
✓		(5) Nearest hazard ahead of line of motion.
✓		(6) Danger bearing pointed out to Conn.
✓		(7) Depth of water compared to charted depth.

YES	NO	
✓		(8) Distance and clock time to turn.
X		(9) Set and drift.
✓		(10) Relationship to track.
✓		(11) Course and speed recommendation.
✓		(12) CIC concurrence.
		l. Course recommendations:
X		(1) Set and drift, advance and transfer and compass error taken into account.
✓		(2) New course searched by bridge and CIC for dangers and shipping.
		m. Log keeping:
✓		(1) Deck Log.
✓		(2) Magnetic Compass Book.
✓		(3) Bridge-to-Bridge Radio Telephone.
✓		(4) Bearing Record Book.
		n. Turn bearings/turn ranges:
✓		(1) Reports given in "distance to turn".
✓		(2) Timely given to Conn.
✓		(3) Objects physically pointed out to Conn.
✓		(4) Adjusted for being off proposed track.
		o. Communications between Conn, CIC and Navigator:
✓		(1) Piloting situation.
✓		(2) Course and speed.
✓		(3) Material condition effecting speed, steering or stability.

YES	NO	
✓		(4) Intentions or deviations from proposed track.
✓		p. Conn used danger bearings/angles to keep clear of shoal waters.
✓		q. Bridge free of unnecessary noise.
		r. Navigator:
✓		(1) Directly supervised navigational team.
	✓	(2) Engrossed in one aspect of piloting to the detriment of the overall picture.
		s. XO:
✓		(1) Monitored the navigation team's performance.
	✓	(2) Took corrective action on substandard navigational team performance.
		t. Lookouts/sound-powered phone talkers:
✓		(1) Fully qualified.
✓		(2) Information correlated with shipping and navigational picture.
✓		(3) Alerted to watch for upcoming contacts.
✓		u. CIC:
✓		(1) Surface plot maintained.
✓		(2) Shipping Officer and Navigator kept each other informed of the others situation.
✓		(3) Shipping Officer made recommendations to Conn.

2. Comments: _____

_____

_____

FB-6
INSTRUCTOR/OBSERVER

NAV (F)

DEPARTMENT OF THE NAVY
COMMANDER DESTROYER SQUADRON FIVE
FLEET POST OFFICE
SAN FRANCISCO, CALIFORNIA 96601-4706

3800
Ser N5/ 242
03 JUL 1989

From: Commander, Destroyer Squadron 5
To: Commanding Officer, USS KINKAID (DD 965)

Subj: GRADING OF EXERCISES

Ref: (a) FXP 4 (Rev F)

Encl: (1) Grade Sheet for Exercise MOB-N-4-SF
(2) Grade Sheet for Exercise MOB-N-6-SF
(3) Grade Sheet for Exercise MOB-N-7-SF

1. On 10 June 1989, USS KINKAID conducted three navigation exercises and a navigation evaluation and was observed by a representative of Commander, Destroyer Squadron FIVE. Enclosures (1) through (3) are grade sheets prepared in accordance with reference (a).

2. The following grades are awarded:

EXERCISE	SCORE	ADJECTIVE GRADE
MOB-N-4-SF PILOTING BY GYROCOMPASS	98	OUTSTANDING
MOB-N-6-SF LOW VISIBILITY PILOTING	SAT	SAT
MOB-N-7-SF LOSS OF GYROCOMPASS	100	OUTSTANDING

ENCLOSURE (1)
94

MOB-N-4-SF - PILOTING BY GYROCOMPASS

1. Ship: USS KINKAID
   Date: 10JUN89
   Subjective Grade: 98
   Objective Grade: Outstanding.

2. EVALUATION

Marking Factors	Maximum Credit	Score
1. Preparation and Readiness		
(a) Organization of the Navigation team	5	3
(1) Points were deducted because the SPS-55 Surface Search Radar needed to be further tuned after getting underway.		
(b) Bridge and CIC navigation teams using same charts, 10 reference symbols, track, etc	10	10
(c) Corrected charts employed	5	5
(d) Proper laying out of proposed track, shoal water, and turn bearings	10	10
(e) Tide and Current data determined	4	4
(f) Gyro error determined	4	4
(g) Time check conducted and clocks reset	2	2
2. Frequency of obtaining fixes (interpolate if necessary)		
(a) Less than 2 minutes	35	35
(b) 2 to 4 minutes		N/A
(c) Over 4 minutes		N/A
3. Usefulness of information to conning officer and ability of ship to maintain track	25	25
Maximum Score: 100	Total Score:	98

Encl (1)

MOB-N-6-SF - LOW VISIBILITY PILOTING

Ship: USS KINKAID
Date: 10JUN89
Subjective: SAT
Objective: SAT

COMMANDING OFFICER (OR OFFICER OF THE DECK)

1. Assume conn. SAT

2. Order execution of procedures outlined in ship's bill for simulation of low visibility conditions. SAT

3. Conform to rules of the road and answered all questions about fog signals correctly. SAT

NAVIGATOR

1. Lay out proposed track. SAT

2. Plot movements of ship and recommend courses. SAT

3. Report relation of ship's position to proposed track, shoal water, and navigational aids. SAT

4. Use available equipment and aids to navigation in recommending courses and plotting movements and select those devices which give the most accurate information. SAT

5. Monitor recommendations originating in CIC. SAT

6. Compute set and drift. SAT

CIC

1. Use all available equipment (sonar, fire control radars, surface search radars, fathometer, and so forth). SAT

2. Lay out proposed track as directed by navigator. SAT

3. Make recommendations on courses and speeds to the navigator. SAT

4. Maintain ship's position and report relation to proposed track, geographic position, and shoal water. SAT

5. Report all surface contacts and their movements. SAT

6. Correlate lookout information. SAT

LOOKOUTS

Report all audible shipping and navigational aids beyond 150 yards and within normal hearing range, by appropriate (simulated) fog signal. SAT

Observers comments: Lookouts answered all questions about fog signal correctly but were not familiar with the fog signals of navigational aids of the area.

Total Score: SAT

MOB-N-7-SF - PILOTING BY GYROCOMPASS

1. Ship: USS KINKAID
   Date: 10JUN89
   Subjective Grade: 100
   Objective Grade: Outstanding.

2. EVALUATION

Marking Factors	Maximum Credit	Score
1. Preparation and Readiness		
(a) Organization of the Navigation team	5	5
(b) Tide and current data determined	5	5
(c) Laying out proposed track	5	5
(d) Correct chart employed	5	5
2. Frequency of obtaining fixes (interpolate if necessary)		
(a) Less than 2 minutes	20	20
(b) 2 to 4 minutes		N/A
(c) Over 4 minutes		N/A
3. Accuracy of fixes (Interpolate is permissible) (Average of at least 8 consecutive fixes measured against an independent plot of ship's track by standard methods)	35	35
(a) 0-25		
(b) 26-50		
(c) 51-75		
(d) 76-100		
(e) Over 100		
4. Usefulness of information to conning officer ...	25	25
Maximum Score: 100	Total Score:	100

Pub. No. 9

AMERICAN PRACTICAL NAVIGATOR

BOWDITCH

Volume I

1984

DEFENSE MAPPING AGENCY HYDROGRAPHIC/TOPOGRAPHIC CENTER

Uniform System

As recommended by the League of Nations in 1936, a country uses the *Uniform ateral System* or the *Uniform Cardinal System,* or both, according to its require- ients or preference. When both are used, the transition from one to the other must e clearly indicated in appropriate publications, such as sailing directions, or by itable buoyage marks.

Both the Uniform Lateral System and the Uniform Cardinal System employ opmarks as an additional means of identification. Unless otherwise stated in this ppendix, a topmark is painted the darker of the colors used on the buoy. They are ptional in every case except on wreck buoys in the Uniform Cardinal System. opmarks are not used in the United States System.

In both the Uniform Lateral System and the Uniform Cardinal System, lighted oys have the same shape as the unlighted buoys shown.

In both the Uniform Lateral System and the Uniform Cardinal System, a quick ashing light is regarded as a single flashing light.

The numbering or lettering of fairway and channel buoys is an optional feature the Uniform Lateral System. In the United States System these buoys are always umbered, commencing from seaward.

IALA MARITIME BUOYAGE SYSTEM

General

nternational Association of Lighthouse Authorities (IALA) is a non-gov- nmental body which brings together representatives of the worldwide community aids to navigation services to promote information exchange as well as recom- end improvements.

In 1980 with the assistance of IMO and the IHO, the lighthouse authorities om 50 countries and representatives of 9 international organizations concerned ith aids to navigation met and adopted the rules of the IALA Maritime Buoyage stem and established the two regions, Region A and Region B. A graphic depict- g the separation of the world in Regions is included in this appendix. Color plates ustrating the IALA Maritime Buoyage System are also included.

Lateral marks differ within Regions A and B. Lateral marks in Region A use d and green colors by day and night to indicate port and starboard sides of annels respectively. In Region B these colors are reversed with red to starboard d green to port.

Scope.—The IALA Maritime Buoyage System applies to all fixed and floating arks, other than lighthouses, sector lights, leading lights and marks, lightships d large navigational buoys (lighthouse buoys), and serves to indicate:

1. the sides and centerlines of navigable channels;
2. natural dangers and other obstructions, such as wrecks;
3. areas in which navigation may be subject to regulation;
4. other features of importance to the mariner.

Fixed Marks.—It should be understood that most lighted and unlighted bea- ns, other than leading marks, are included in the system. In general, beacon pr s will have the same shape and colors as those used on buoys. (Because of e y of beacon structures, the accompanying diagrams show mainly buoy a

Types of Marks.—The system provides *five types of marks* which may be used in any combination:

1. **lateral** marks indicate the port and starboard hand sides of channels;

2. **cardinal** marks, used in conjunction with the compass, indicate that the navigable water lies to the named side of the mark;

3. **isolated danger** marks erected on, or moored directly on or over, dangers of limited extent;

4. **safe water** marks, such as mid-channel buoys; and

5. **special** marks, the purpose of which is apparent from reference to the chart or other nautical documents.

Superseded Marks.—Certain marks were superseded by the introduction of the IALA System, including those which indicate wrecks, middle grounds, secondary channels, bifurcations, and junctions; there are no special "landfall" or "transition" marks in the System. There is no differentiation between the marks for such special features as spoil grounds, anchorages, cable areas, and military exercise areas, all of which will be marked by yellow buoys which may, in addition, carry lettering to indicate the purpose of the buoy.

Characteristics of Marks.—The significance of a mark depends on one or more features:

1. *by day*—color, shape, and topmark;

2. *by night*—light color and phase characteristics.

Colors of Marks.—The colors **red** and **green** are reserved for lateral marks, and **yellow** for special marks. The other types of marks have **black and yellow** or **black and red** horizontal bands or **red and white** vertical stripes, as described later.

Shapes of Marks.—There are *five basic buoy shapes,* namely, can, conical, spherical, pillar, and spar. In the case of can, conical, and spherical, the shape indicates the correct side to pass. With pillar and spar buoys, the shape has no such special significance.

The term "pillar" is used to describe any buoy which is smaller than a "lighthouse buoy" and which has a tall, central structure on a broad base; it includes beacon buoys, high focal plane buoys, and others (except spar buoys) whose body shape does not indicate the correct side to pass.

It must be understood that much existing equipment will be used in the new system including, for example, light-floats. Variations on the basic shapes will therefore be fairly common but, by day, the colors and topmarks should prevent ambiguity.

Topmarks.—The IALA System makes use of can, conical, spherical, and X-shaped topmarks only. Topmarks on pillar and spar buoys are particularly important and will be used wherever practicable, but ice or other severe conditions may occasionally prevent their use.

Colors of Lights.—Where marks are lighted, red and green lights are reserved for lateral marks, and yellow for special marks. The other types of mark have a white light, distinguished one from another by phase characteristic.

Rhythms of Lights.—Red and green lights may have any phase characteristic, as the color alone is sufficient to show on which side they should be passed. Special marks, when lighted, have a yellow light with any phase characteristic not reserved for white lights of the system. The other types of mark have clearly specified phase characteristics of white light: various quick flashing phase characteristics for cardinal marks, group flashing (2) for isolated danger marks, and relatively long periods of light for safe water marks.

Some shore ligh
dence, have charact
marks. Care is need

Lateral Marks–
used for well-define
the route to be follo
of buoyage.

This direction is

1. **local directi**
proaching a harbor,

2. **general direc**
buoyage authorities
masses, given in s
symbol.

In some places,
of buoyage may be c

Cardinal Mark
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interest. A cardinal

The mariner is
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Uses.—A cardi

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tion, or end of a sh

Topmarks.—Bl
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difficult to rememb
down) are the east
point to point) topm

Cardinal mark
as possible and clea

Colors.—Black
The position of th
topmarks, thus:

North—Po
South—Po
West—Poi
East—Poi

Shape.—The s
buoy will be pillar

Some shore lights, specifically excluded from the IALA System, may, by coincidence, have characteristics corresponding to those approved for use with the new marks. Care is needed to ensure that, on sight, such lights are not misinterpreted.

Lateral Marks

Lateral Marks—Direction of Buoyage Marks.—Lateral marks are generally used for well-defined channels; they indicate the port and starboard hand sides of the route to be followed, and are used in conjunction with a *conventional direction of buoyage.*

This direction is defined in one of two ways:

1. **local direction of buoyage**—the direction taken by the mariner when approaching a harbor, river estuary, or other waterway from seaward;

2. **general direction of buoyage**—in other areas, a direction determined by the buoyage authorities, following a clockwise direction around continental land masses, given in sailing directions, and, if necessary, indicated on charts by a symbol.

In some places, particularly straits (being open at both ends), the local direction of buoyage may be over-ridden by the general direction.

Cardinal Marks

Cardinal Marks.—Names of Marks.—A cardinal mark is used in conjunction with the compass to indicate where the mariner may find the best navigable water. It is placed in one of the four quadrants (north, east, south, and west), bounded by the true bearings NW-NE, NE-SE, SE-SW, and SW-NW, taken from the point of interest. A cardinal mark takes its name from the quadrant in which it is placed.

The mariner is safe if he passes north of a north mark, east of an east mark, south of a south mark, and west of a west mark.

Uses.—A cardinal mark may be used to:

1. indicate that the deepest water in an area is on the named side of the mark;

2. indicate the safe side on which to pass a danger; and

3. draw attention to a feature in a channel such as a bend, junction, bifurcation, or end of a shoal.

Topmarks.—Black double-cone topmarks are the most important feature, by day, of cardinal marks; *the arrangement of the cones must be memorized.* More difficult to remember than north (two cones points up) and south (two cones points down) are the east (one cone point up, one cone point down) and west (two cones point to point) topmarks: 'W for Wineglass' may help.

Cardinal marks carry topmarks whenever practicable, with the cones as large as possible and clearly separated.

Colors.—Black and yellow horizontal bands are used to color a cardinal mark. The position of the black band, or bands, is related to the points of the black topmarks, thus:

North—Points up—Black band above yellow band.

South—Points down—Black band below yellow band.

West—Points inward—Black band with yellow bands above and below.

East—Points outward—Black bands above and below yellow band.

Shape.—The shape of a cardinal mark is not significant, but in the case of a buoy will be pillar or spar.

Lights.—When lighted, a cardinal mark exhibits a white light; its characteristics are based on a group of quick or very quick flashes which distinguish it as a cardinal mark and indicate its quadrant.

The distinguishing quick or very quick flashes are:

North—Uninterrupted.
East—three flashes in a group.
South—six flashes in a group followed by a long flash.
West—nine flashes in a group.

As a memory aid, the number of flashes in each group can be associated with a clock face (3 o'clock—E, 6 o'clock—S, and 9 o'clock—W).

The long flash (of not less than 2 seconds duration), immediately following the group of flashes of a south cardinal mark, is to ensure that its six flashes cannot be mistaken for three or nine.

The periods of the east, south, and west lights are, respectively, 10, 15, and 15 seconds if quick flashing; and 5, 10, and 10 seconds if very quick flashing.

Quick flashing lights flash at a rate between 50 and 79 flashes per minute, usually either 50 or 60. Very quick flashing lights flash at a rate between 80 and 159 flashes per minute, usually either 100 or 120.

It is necessary to have a choice of quick flashing or very quick flashing lights in order to avoid confusion if, for example, two north buoys are placed near enough to each other for one to be mistaken for the other.

Isolated Danger Marks

Isolated Danger Marks—Use.—An isolated danger mark is erected on, or moored on or above, an isolated danger of limited extent which has navigable water all around it. The extent of the surrounding navigable water is immaterial: such a mark can, for example, indicate either a shoal which is well offshore or an islet separated by a narrow channel from the coast.

Charted Position.—On a chart, the position of a danger is the center of the symbol or sounding indicating it; an isolated danger buoy will inevitably therefore be slightly displaced on the chart.

Topmark.—A black double-sphere topmark is, by day, the most important feature of an isolated danger mark and, whenever practicable, this topmark will be carried, with the spheres as large as possible, disposed vertically, and clearly separated.

Color.—Black with one or more red horizontal bands are the colors used for isolated danger marks.

Shape.—The shape of an isolated danger mark is not significant, but in the case of a buoy will be pillar or spar.

Light.—When lighted, a white flashing light showing a group of two flashes is used to denote an isolated danger mark. The association of two flashes and two spheres in the topmark may be a help in remembering these characteristics.

Safe Water Marks

Safe Water Marks—Use.—A safe water mark is used to indicate that there is navigable water all around the mark. Such a mark may be used as a center line, mid-channel, or landfall buoy.

Color.—Red and white vertical stripes are used for safe water marks, and distinguish them from the black-banded, danger-marking marks.

Shape.—Sph
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by a pillar or spa
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seconds.
~~The associati~~
~~help in remember~~

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sailing directions
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3. spoil groun
4. military ex
5. cable or pi
6. recreation
Another func
example, a chann
channel for norn
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ate lateral shapes
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water marks, i.e.:
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five flashes every

New Danger
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Marking.—A
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Shape.—Spherical, pillar, or spar buoys may be used as safe water marks.

Topmark.—A single red sphere topmark will be carried, whenever practicable, a pillar or spar buoy used as a safe water mark.

Light.—When lighted, safe water marks exhibit a white light, occulting, or ual interval (isophase), or showing a single long flash, or Morse "A." If a long sh (i.e. a flash of not less than 2 seconds) is used, the period of the light will be 10 conds.

~~The association of a single flash and a single sphere in the topmark may be a lp in remembering these characteristics~~. 45/87 NTM

Special Marks

Special Marks—Use.—A special mark may be used to indicate to the mariner a ecial area or feature, the nature of which is apparent from reference to a chart, iling directions, or notices to mariners. Uses include:

1. Ocean Data Acquisition System (ODAS), i.e. buoys carrying oceanographic or eteorological sensors;
2. traffic separation marks;
3. spoil ground marks;
4. military exercise zone marks;
5. cable or pipeline marks, including outfall pipes; and
6. recreation zone marks.

'her function of a special mark is to define a channel within a channel. For xa , a channel for deep draft vessels in a wide estuary, where the limits of the hannel for normal navigation are marked by red and green lateral buoys, may ave the boundaries of the deep channel indicated by yellow buoys of the appropri- te lateral shapes, or its center line marked by yellow spherical buoys.

Color.—Yellow is the color used for special marks.

Shape.—The shape of a special mark is optional, but must not conflict with hat used for a lateral or a safe water mark. For example, an outfall buoy on the ort hand side of a channel could be can-shaped but not conical.

Topmark.—When a topmark is carried it takes the form of a single yellow X.

Light.—When a light is exhibited it is yellow; the phase characteristic may be ny, other than those used for the white lights of cardinal, isolated danger, and safe water marks, i.e.:

Group-occulting, single-flashing, group-flashing with a group of four, five, or exceptionally) six flashes, composite group-flashing and morse code light. In the case of ODAS buoys, the phase characteristic used is group-flashing with a group of five flashes every 20 seconds.

New Dangers

New Dangers—Definition.—A newly discovered hazard to navigation not yet shown on charts, or included in sailing directions, or sufficiently promulgated by notices to mariners, is termed a **new danger.** The term covers naturally occurring obstructions such as sandbanks, rocks, or man-made dangers such as wrecks.

Marking.—A new danger is marked by one or more cardinal or lateral marks ir rdance with the System rules. If the danger is especially grave, at least one o marks will be duplicated as soon as practicable by an identical mark until the danger has been sufficiently promulgated.

Lights.—If a lighted mark is used for a new danger, it must exhibit a quick flashing or very quick flashing light. If it is a cardinal mark, it must exhibit a white light; if a lateral mark, a red or green light.

Racons.—The duplicate mark may carry a Racon, coded D(—·), showing a signal length of 1 nautical mile on a radar display.

Chart Symbols and Abbreviations

Changes.—New symbols and abbreviations, and altered ones, are being incorporated in DMAHTC charts when they are corrected or reprinted for use with the IALA Buoyage System. Symbols and abbreviations shown on charts to represent older systems of buoyage will remain unchanged until the new System is introduced into those areas.

Conventional Direction of Buoyage.—Where the conventional direction of buoyage may be open to doubt it is indicated on charts by a magenta symbol.

Pillar buoys.—The various forms of buoy termed 'pillar buoy' are indicated by the symbol introduced in 1976 for this purpose.

Spar buoys and Beacons.—The symbol for a spar buoy is also used to indicate a spindle buoy. In accordance with standard practice, spar buoy symbols are sloped to distinguish them from beacon symbols which are upright.

Colors.—The shading of buoy symbols formerly used to indicate the colors of buoys is omitted. A black (i.e. filled-in) symbol is used for green marks and for all spar buoys and beacons; an open symbol is used for all other colored buoys and beacon towers.

The abbreviated description of the color, or colors, of a buoy is given under the symbol.

Where a buoy is colored in bands, the colors are indicated in sequence from the top, e.g. east buoy—black with yellow band—BYB. If the sequence of the bands is not known, or if the buoy is striped, the colors are indicated with the darker color first, e.g. safe water buoy—red and white stripes—RW.

Topmarks.—Topmarks are charted boldly. Topmark symbols are inserted in solid black except when the topmark is red.

Lights.—The period of the light of a cardinal mark is determined by its quadrant and by whether the light is a quick light or a very quick light; the period is less important than its phase characteristic. Where space on charts is limited, and on second and smaller scale charts, the period may be omitted.

Light-stars.—Light-star symbols, formerly inserted above buoy symbols (and below the topmarks, if fitted), are omitted. This enables the topmark symbol to stand out more clearly, and avoids confusion with the X-shaped topmarks used on some special marks.

Light-flares.—Magenta light-flares are inserted with their points adjacent to the position circles at the base of the symbols: this avoids the light-flares obscuring the topmark symbols, and is in line with international chart practice.

Radar reflectors.—Radar reflectors are not affected by the IALA buoyage rules, but in 1976 their general significance was reconsidered in the study initiated by the need for new symbols. It was decided not to chart them on the introduction of the new buoyage for several reasons: it can be assumed that most major buoys are fitted with radar reflectors (some nations have already ceased to chart them on these grounds); it is necessary to reduce the size and complexity of buoy symbols and associated legends; and it is understood that, in the case of cardinal buoys, buoyage authorities site the reflector so that it cannot be mistaken for a top.

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Promulgation of details of System 'A' symbols and abbreviations.—The symbols and abbreviations representative of IALA Maritime Buoyage System may be found in U.S. Chart No. 1, Nautical Chart Symbols and Abbreviations.

Implementation of the IALA Maritime Buoyage System.—Introduction of the new buoyage began in the Dover Strait in 1977. By the end of 1982 the process will have been completed in northwest Europe, including the Baltic Sea; in west Europe and in much of the Mediterranean Sea and the Red Sea; also in Singapore, Australia, Hong Kong, and parts of Africa, the Gulf, New Zealand, Malaysia, and Indonesia. Programs for the other areas have been drawn up.

In January of each year, the latest information about the progress to date, the program for the coming 12 months, and the long term schedule, is given in U.S. Notices to Mariners.

CHAPTER 5

Tactical Navigation and Ship Control Management

5.1 OVERVIEW

Operations in restricted waters, over the horizon targeting, direct support operations, and the requirement for rendezvous under emission control conditions, dictate a high degree of accuracy in navigation and proficiency in ship control. To obtain the accuracy demanded by current tactics, position data shall be drawn from all available sources to identify miscalculations and reduce errors. Only accurate navigation on the part of each ship and an accurate plot of force elements by the officer in tactical command will ensure weapons launched destroy the intended target.

5.1.1 Ship Control. Conning of the ship and ship control is exercised by the officer of the deck (OOD) from the bridge. Maneuvering command control, can be shifted to the tactical action officer (TAO), ship weapon coordinator, antisubmarine warfare operations coordinator, or the antisubmarine warfare fire control officer as required by the tactical situation and authorized by the commanding officer (CO). In situations, such as maneuvering at close quarters, maneuvering in restricted waters, and in defense against surface attack where visual observation, visual identification, and "seaman's eye" judgement form the best basis for maneuvering decisions, maneuvering control will be exercised from the bridge by the CO/OOD.

5.1.2 Relationship of the OOD, TAO, and Navigator. The TAO requests and receives maneuvering control from the OOD. The TAO then directs rudder and engine orders using the JA sound powered circuit or the 21MC in an emergency. The OOD can take maneuvering control at anytime for safety or self defense. In readiness condition III or higher, when a station other than the bridge has maneuvering control, ship control orders to the OOD are received by the junior officer of the deck (JOOD) manning the 1JS circuit which are then passed to the helmsman/lee helmsman, as appropriate. In such cases, the JOOD will normally have the conn, supervised by the OOD. The JA talker is back-up for conning orders. The navigator recommends courses and speeds to safely carry out operational commitments.

5.2 NAVIGATION ORGANIZATION, COMMUNICATIONS, AND RESPONSIBILITIES

Figure 5-1 lists the members of the navigation team, sound-powered phone circuits used for information flow, and conditions when stations are manned.

The responsibilities of the navigator and OOD are specified in OPNAVINST 3120.32 Standard Organization and Regulations Manual. The CO may amplify/amend these responsibilities in the Standing and Night Orders.

Team Member	Location	S/P Phone Circuit	Special Sea and Anchor Detail	Navigation Detail	Low Visibility Piloting	Naval Gunfire Support	At-Sea Operations
OOD and JOOD	Pilothouse	---	X	X	X	X	X
Quartermaster of the Watch	Pilothouse	---	X	X	X	X	X
NTDS Console Operator	Pilothouse	NTDS Inter-phone	X	X	X	X	X
Navigator	Pilothouse	---	X	X	X	X	
Surface Search Radar Operator (Navigator's)	Pilothouse	---	X	X	X	X	
Navigation Plotter	Pilothouse	JW	X	X	X	X	
Bearing Recorder	Pilothouse	JW	X	X	X	X	
Port Bearing Taker	Port Bridge Wing	JW	X	X	X	X	
Starboard Bearing Taker	Stbd Bridge Wing	JW	X	X	X	X	
CIC Liaison Talker	Pilothouse	1JS	X	X	X	X	
Bridge Surface Status Board Keeper	Pilothouse	---	X	X	X	X	
Port Lookout	Port Bridge Wing	JW	X	X	X	X	
Starboard Lookout	Port Bridge Wing	JW	X	X	X	X	
After Lookout	Port Bridge Wing	JW	X	X	X	X	
Forward Low Visibility Lookout	Forecastle	---			X		
Forward Lookout Phone Talker	Forecastle	JW			X		
After Low Visibility Lookout	Fantail	---			X		
After Lookout Phone Talker	Fantail	JW			X		
CIC Watch Officer	CIC	1JS	X	X	X	X	X
Piloting Officer	CIC	1JS	X	X	X	X	
Shipping Officer	CIC	NTDS Inter-phone	X	X	X	X	
CIC Supervisor	CIC	---	X	X	X	X	X
Navigation Plotter	CIC	---	X	X	X	X	
Navigation Radar Operator	CIC	---	X	X	X	X	

Figure 5–1. Navigation Team Manning and Communications (Sheet 1 of 2)

Team Member	Location	S/P Phone Circuit	Special Sea and Anchor Detail	Navigation Detail	Low Visibility Piloting	Naval Gunfire Support	At-Sea Operations
Surface Search Operator	CIC	21JS	X	X	X	X	X
Navigation Fix Log Recorder	CIC	---	X	X	X	X	
Target Plotter	CIC	---				X	
Lookout Talker/Plotter	CIC	JL	X	X	X	X	X
DRT Operator	CIC	21JS	X	X	X	X	X
Surface Status Board Keeper	CIC	21JS	X	X	X	X	X
Radio Telephone Recorder	CIC	---	X	X	X	X	X
CIC Log Recorder	CIC	---	X	X	X	X	X
ESM Operator	ESM	---	X	X	X	X	X
GCC Operator	CIC	JW/JG	X	X	X	X	
Sonar Supervisor	Sonar Control	1JS	X	X	X	X	X
AN/SQS-53 Sonar Operators	Sonar Control	---	X	X	X	X	X
Leadsman	Forecastle		X		X		
Leadsman Talker	Forecastle	1JV	X		X		
Central Control Phone Talker	Main Control	1JV	X	X	X	X	X
Lee Helmsman	Pilothouse	1JV	X	X	X	X	X
After Steering Helmsman	After Steering	1JV	X		X	X	X
Lookout Coordinator	Bridge	JL	X	X	X	X	X

Figure 5-1. Navigation Team Manning and Communications (Sheet 2 of 2)

5.3 NAVIGATION PLANNING AND PREPARATIONS

Responsibility of the navigator for navigational planning and preparations is contained in figure 5-2. The responsibilities of the combat information center officer (CICO) are shown in figure 5-3. Paragraph 5.5 contains a planning check list of items to be completed by the navigator at least 24 hours prior to each underway.

5.4 NAVIGATION CONDITIONS OF READINESS

Four navigation conditions of readiness are defined as follows:

1. Piloting (Restricted Waters). Set any time the ship is approaching or is operating in such areas as restricted waters, channels, or narrow straits.

1. The navigator shall ensure that:
   - All sailing directions, coast pilots and fleet guides are corrected and of the latest revision
   - Charts to be used are corrected as of the latest Notice to Mariners
   - Ship's proposed track is laid down on all charts to be used for navigation. On all tracks, the following items will be accurately plotted or indicated:
     - Course and distance of each leg
     - Danger bearings and ranges to navigational hazards
     - Turning bearings and turning ranges, allowing for ship's advance and transfer
     - Points from which bearings are planned to be taken
     - Designation of each navigation point by a letter/letter number combination
     - Hazards to navigation
   - Proposed track indicates the ship's intended position according to the movement report (MOVREP), or other orders under which the ship is operating
   - The proposed track is checked independently by a second person, preferably the operations officer, for accuracy and correctness
   - The proposed track is submitted to the CO for approval
   - Message traffic has been reviewed for data pertaining to navigation aids
   - Day and night characteristics of all navigational landmarks intended for use have been properly determined
   - Navigational and operational plans for those portions of the voyage outside of restricted waters are prepared in detail
   - All navigation equipment is onboard and operating properly
   - Gyro error is determined, recorded in the bearing record book, and compensations set into the parallel motion protractors (PMP) on the bridge and in CIC.

2. Upon approval of the proposed track by the CO, the navigator will:
   - Brief the navigation team, OOD, and CICO prior to getting underway or entering port. The briefing will include:
     - Review of the track to be taken
     - Location of restricted waters and navigation hazards
     - Nomenclature to be used when referring to each navigation point or object
     - Assignment of personnel to specific navigation stations
     - Review of team's duties
     - Assignment of personnel to complete [illegible] prior to getting underway/entering port

Figure 5-2. [illegible] Planning and Preparation Responsibilities of the Ship's Navigator

2. Piloting (Coastal Navigation). Set any time the ship is in coastal waters, or where hazards to navigation are more than in open ocean.

3. Tactical Navigation. Set any time the ship is at condition of readiness III or higher, or whenever tactical navigation accuracy is required. Tactical navigation is required to support all coordinated operations, control of aircraft, use of the naval tactical data system, and the employment of long range weapons. See chapters 8 and 9 for specific guidance concerning

Following the navigator's briefing the CICO will ensure that:

- The approved departure or entry track is laid out on the charts CIC will use for radar navigation
- Charts to be used are corrected as of the latest Notice to Mariners
- Following items are accurately plotted or indicated in addition to that on the navigator's charts
  - Points from which radar ranges are planned to be taken
  - Designation of each point (not to be confused with designations used by the navigator)
- All equipment is checked out and working properly
- Proper personnel are assigned to specific stations to be manned by the radar navigation team
- Duties and responsibilities of each station are reviewed
- Casualty procedures are reviewed

Figure 5–3. Navigational Planning and Preparation Responsibilities of the CIC Officer

SATNAV updates to AN/WSN–5 during Tomahawk prelaunch phase and ship positioning requirements relative to specified Tomahawk launch points.

4. Open Ocean Navigation. Normal, underway open ocean navigation where hazards to navigation are not expected, and tactical navigation accuracy is not required.

Figure 5–4 provides the navigation accuracy requirements and required navigation procedures for each navigation condition of readiness. Figure 5–5 provides the minimum manning required for each condition of readiness.

5.5 NAVIGATION PROCEDURES

5.5.1 Navigator's Piloting Responsibilities. The navigator's piloting responsibilities are shown in figure 5–6.

5.5.2 Bridge Team Navigational Duties. The duties and responsibilities of the bridge navigation team are as contained in figure 5–7. The ships position is to be established by the navigator within an accuracy of ±25 yards every 2 minutes and upon steadying on a new course.

5.5.3 Combat Information Center (CIC) Piloting Team Duties. The duties of the CIC piloting team are contained in figure 5–8. Figure 5–9 provides the format for reporting CIC navigational information to the bridge. The team shall be set each time the ship enters or departs port and especially during periods of low visibility.

5.5.4 Lookouts. Special lookouts are stationed during periods of low visibility. Each lookout is stationed with a 1JV talker who relays all information to and from the OOD and CIC. These lookouts are specially trained and qualified to:

1. Recognize fog signals originated by a ship underway, a ship underway with way on, a ship at anchor, a ship maneuvering (turning, backing down, etc.), small craft underway and the like.

Event	Piloting Restricted Waters	Piloting Unrestricted Waters/Coastal Navigation	Tactical Navigation	Open Ocean
Fix accuracy	± 25 yd	± 100 yd	± 1 nm	± 5 nm
DR track	1 min	5 min	30 min	2 hr
DRA	NA	NA	30 min	1 hr
Gridlock updates	NA	NA	1 hr	4 hr
Fix Methods				
Visual	1 to 2 min	5 min	3 min, if available	15 min, when available
Celestial	NA	NA	Stars (morning and evening)	Stars (morning and evening)
			Sun (morning, 2 + LAN)	Sun (morning, 2 + LAN)
			(afternoon, 3)	(afternoon, 3)
			Planets, when available	Planets, when available
			Moon, when available	Moon, when available
SATNAV	NA	NA	30 min, if available	1 hr, if available
Omega	NA	NA	1 hr	1 to 2 hr
Surface search radar	1 to 2 min	5 min	10 min, when available	15 min, when available
Fire control radar	1 to 2 min	NA	10 min, when available	NA
Correlation				
Visual/radar	1 to 2 min	5 min	10 min, when available	15 min, when available
Celestial/electronic	NA	NA	Every fix/LOP	Every fix/LOP
Bottom contour	NA	NA	Every fix/LOP	Every fix/LOP
Fathometer	Every fix	Every fix	Every fix/LOP	Every fix/LOP
Pilot charts	NA	NA	Environmental information	Environmental information

Figure 5–4. (U) Requirements for Navigation Conditions of Readiness

2. Differentiate between the sound of a ship's whistle and a hand-operated horn.

3. Recognize the sound originated by a bell buoy.

Standard reports from these lookouts include:

1. Relative bearing to the object sighted or heard.

2. Identification of what is heard (whistle, horn, etc.).

3. How many blasts were heard.

4. Duration of the blasts (short or prolonged).

5. Whether the signal being heard is growing louder or weaker.

6. The bearing drift of the object sighted/signal heard.

7. Passing abeam to a buoy or other navigational aid.

8. Estimated visibility.

Piloting Restricted Waters	Piloting Unrestricted Waters/Coastal Navigation	Tactical Navigation	Open Ocean
Bridge • Navigator • OOD • Bearing takers (2) • Bearing recorder • Bearing plotter • Fathometer log keeper	Bridge • Navigator • OOD • Bearing taker • Fathometer log keeper	Bridge • Tactical navigator • OOD • QMOW	Bridge • Navigator (on call) • OOD • QMOW
CIC • Piloting officer • Radar operator • Talker	CIC • CICWO • Radar operator • Navigation Plotter	CIC • TAO/CICWO • Navigation Plotter	CIC • TAO/CICWO • Navigation Plotter
Weapons • Fire control radar operator • Talker		Weapons • Fire control radar operator	

Note: The most experienced personnel available will be used for tactical navigation. The taking and plotting of accurate fixes through all available means, comparative analysis of fix information, and the consistent updating of all navigation equipment is the responsibility of the tactical navigator and quartermaster of the watch (QMOW) and as such they will have no other duties or responsibilities while on watch. The tactical navigator reports to the OOD. Overall tactical navigation procedures and accuracy are the responsibility of the navigator, who reports directly to the CO.

Figure 5–5. Miniminum Manning for Navigation Conditions of Readiness

Standard reports to lookouts include:

1. Identification of signals reported.

2. Objects which will be entering visual/hearing range of the lookouts and their relative bearing.

3. Course changes.

5.5.5 Conning Aids for the Officer of the Deck. Certain useful aids for conning the ship are listed in figure 5–10.

5.5.6 Navigational Procedures While in Open Seas. The procedures to be followed while in open seas are contained in figure 5–11. Figure 5–12 provides a quartermaster of the watch (QMOW) watch-to-watch turnover check list. The QMOW will obtain a fix once every 30 minutes with an accuracy of ±2 nm ~~using both Omega and navigation satellite~~. The navigator will obtain the ship's position at 0800, 1200 and 2000 daily and will submit a written report of the ship's position at that time to the CO. If the QMOW is unable to obtain a satisfactory fix he will notify the OOD who will then advise the navigator. During condition of readiness I and during other conditions/situations when the navigator is on the bridge, he will be responsible for obtaining the ships position every 30 minutes.

5.5.7 Navigation Data Dissemination. The navigator must take a systems approach to the entire tactical navigation problem. One of the most common sources of reporting errors within a ship is the failure to establish and follow careful procedures for passing the best available position from the bridge to combat and to the ship's weapons systems. Elimination of reporting

The navigator will ensure that:

- Bearings are first taken on designated objects forward of the beam, then those abaft the beam
- Ship's position is fixed at least once every 2 minutes
- Standard fix accuracy of 25 yards or less is maintained
- Set and drift is determined upon obtaining each fix
- A dead reckoning (DR) track is projected ahead for at least 4 minutes after each fix
- Each fix and subsequent DR track is examined to ensure that the ship is not standing into danger
- Recommended course changes are provided far enough in advance to compensate for advance and transfer
- A fix is obtained as soon as the ship is steady on the new course
- If OOD takes an action other than that recommended by the navigator he will make a positive statement to that effect, such as: "I do not concur with your course of action"
- If the OOD does not accept the navigator's recommendations, a report of that fact shall be made to the CO and entered in the deck log. The OOD and CO shall acknowledge the navigator's declarations
- Fixes are obtained from aids to navigation and fixed markers rather than buoys
- Fixes are verified by all available means including soundings, radar, and electronic aids
- Bearing recorders and plotters are aware of the direction and magnitude of errors present in the indicators
- The bearing recorder logs the bearing as reported
- The plotter applies a correction to the bearings reported to compensate for gyro error
- Soundings are taken continuously and reported as each round of bearings are being taken
- The fathometer is energized and recording when the ship is in less than 100 fathoms of water
- No recorded errors are erased. A line is drawn through the entry and initialed by the recorder or plotter
- All recommendations are followed by the OOD
- Complete and accurate navigation records are maintained

Figure 5-6. Navigator's Piloting Responsibilities

errors within a ship and ensure that the navigator and combat systems officer spend a fair amount of time to determine who requires which navigation information and tracing the information flow among systems. The navigator must be directly responsible not just for a good navigation picture on the bridge, but also for the quality of navigation data passed to every user, inside and outside the ship. Among other things, this means that the navigator must know in detail who uses navigation information and what paths are available for getting the information to the user. The navigator should check, on a regular basis, that bridge and combat personnel agree on where the ship is; if the ship has an inertial navigation system, the navigator should also check that its position is consistent with where the bridge thinks the ship is. It is also

Navigation Plotter	• Maintains the navigator's plot • Establishes ship's position based on data received from the bearing takers, at least every 2 minutes • Computes set and drift after each fix • Projects (DRs) ahead a minimum of 4 minutes from the last fix • Evaluates each fix for accuracy • Computes time and distance to next course change • Advises the navigator where he holds the ship relative to the projected track • Makes timely recommendations to the navigator
Bearing Recorder (JW)	• Records time, bearing and navigation aids as reported by the bearing takers • Gives "marks" to the bearing takers • Logs all data in the U.S. Navy Standard Bearing Book, OPNAV Form 3530/3
Bearing Takers (JW)	• Obtains and reports accurate bearings to designated navigation aids when directed by the bearing recorder • Maintains visual watch for hazards to navigation • Recommends navigation aids to be used • Reports when gaining and losing sight of navigation aids • Maintains visual watch for other shipping in the area • Keeps designated navigation aids in sight between shots
CIC Liaison Talker (1JS)	• Relays information between the navigator and the CIC piloting officer
Leadsman Talker (1JV)	• Passes soundings obtained to CO, OOD, and navigator

Figure 5–7. Duties and Responsibilities of the Bridge Navigation Team

imperative that the navigator monitor the flow of navigation data to any other user such as an embarked staff or Outboard.

5.6 NAVIGATION CHECK LIST

Figures 5–13 through 5–17 contain check lists to aid in navigation planning/preparation.

5.7 LOOKOUT MANAGEMENT

5.7.1 Station Assignments. Lookouts are stationed at all times underway and are under the direct supervision of the OOD through the boatswain mate of the watch. Additional lookouts will be posted as necessary. Lookout stations are shown in figure 5–18.

Plotting Team

AN/SPS–55 Radar Operator	• Reports range to designated navigation points/aids when directed by the navigation plotter in CIC • Radar is in the SP mode
GCC Operator	• Reports bearing and range to a single designated navigation aid when directed by the navigation plotter in CIC
Lookouts	• Report sightings of navigation aids, such as buoys
Recorder	• Records fixes and data provided by the AN/SPS–55 and GCC operators
Navigation Plotter	• Maintains the navigation plot in CIC • Establishes ship's position based on the data received from the AN/SPS–55 and GCC operators at least every 2 minutes • Coordinates the times of radar fixes to coincide with visual fixes • Compares reports from lookouts to ship's position established by radar • Computes set and drift after each fix • Projects (DRs) ship's track ahead a minimum of 4 minutes from the last fix • Evaluates each fix for accuracy. If a fix is not obtained immediately, calls for another round of bearing/range data • Computes time and distance to next course change • Advises the piloting officer where he holds the ship relative to the projected track • Makes timely recommendations to the piloting officer
Piloting Officer	• Supervises the performance of the CIC navigation team • Designates navigation points/aids to be used by the AN/SPS–55 and GCC operators • Makes final decision as to the accuracy of the fix • Reports ship's position, set and drift, and hazards to the navigator via the 1JS. (See figure 5–9 for reporting format.)

Shipping Team

Surface Search Radar Operator (21JS)	• Mans designated radar repeater or OJ–196 • Selects a range scale between 5 to 10 miles • Recommends to the AN/SPS–55 radar operator any changes in mode/activation of selected ECCM circuits needed to maintain a good radar picture • Designates and reports bearing and range to all surface contacts forward of the beam and those closing from aft • Estimates CPA on all surface contacts which are closing • Ceases reporting surface contacts which are opening upon direction from OOD
Sonar Operator	• Reports surface contacts held omit shipping officer report contact is held on radar or is opening
Lookouts (JL)	• Report bearing, target angle and identification of all shipping held in their sector of responsibility
Status Board Keeper (JL)	• Relays lookout reports to the navigation plotter, status board keeper and shipping officer as appropriate • Records and displays shipping data provided by the surface search radar operator, sonar operator and lookouts

Figure 5–8. Duties of the CIC Piloting Team (Sheet 1 of 2)

Shipping Team (Cont.)

Shipping Plotter	• Plots all surface contacts reported • Computes course, speed, CPA and time of CPA on all surface contacts reported • Computes projected CPA when ship is preparing to turn • Alerts shipping officer of potential dangers
Shipping Officer	• Supervises the performance of the shipping team, assisted by the CIC supervisor • Passes evaluated shipping information to the OOD, piloting officer and navigator. (See figure 5–9.) • Recommends to the OOD course/speed changes to avoid shipping

Figure 5–8. Duties of the CIC Piloting Team (Sheet 2 of 2)

(1) NAVIGATION
Based upon _____ fix/DR/EP/at _____, we are _____ yards _____ left/right of proposed track. Nearest shoal water is _____ yards on port/starboard bow/beam/quarter. Fathometer reads _____ fathoms/feet. Agrees/does not agree with charted depth of _____ fathoms/feet. Nearest hazard is _____ (type hazard/distance) yards on port/starboard bow/beam/quarter. There are _____ yards to next turning point, _____ minutes at this speed. Recommend coming _____ left/right to course _____ at time _____. We hold set and drift to be _____. CIC concurs/does not concur with ship's position.

(2) SHIPPING PASSAGE (INLAND)
Recommend sounding _____ (whistle signal) to propose/concur port/port or starboard/starboard passage with _____ (designation). Recommend coming left/right to course _____ to facilitate passage. Recommend sounding _____ (whistle signal). Do or do not concur proposal made by _____ (designation).

(3) RUDDER INDICATION (INTERNATIONAL)
Recommend sounding _____ (whistle signal) and coming left/right to course _____ Reason: _____

(4) LOW VISIBILITY (DIW)
Based upon _____ (fix/EP/DR) time _____, we are _____ yards (left/right) of proposed track, standing in good water.

(5) LOW VISIBILITY (WAY ON)
Based upon _____ (fix/EP/DR) time _____, we are _____ yards (left/right) of proposed track, standing into good water. Nearest aid is _____ at _____ bearing _____ range _____. P/S lookout reports (signal) (strength) on the (relative bearing), on track/course _____ speed _____, CPA _____.

Figure 5–9. Format for Reporting Navigational Information From CIC to the Bridge

The OOD will:

- When ordering rudder, look in both the direction of the intended turn and in the direction that the stern will swing
- Ensure that the rudder angle indicator moves in the direction ordered
- When ordering changes in rudder, order the final intended course, if known
- Study the chart in use frequently. Know the situation outside the buoyed channel
- Pass buoys well clear and ensure that the bearing to buoys change as they are approached
- Immediately resolve any doubt as to the ship's track or position. Stop the ship if in doubt
- Use the bearing circles and the navigator's turning bearings to initiate all changes in course while conforming to the intended track
- Use range markers and fixed objects ashore to evaluate the effect of current. Confirm the navigator's predictions and estimates with estimates of your own
- Direct the taking of soundings and be cognizant of the minimum depths required for safe passage
- When operating with other ships in restricted waters, do not rely on the ship ahead, or wake of the ship ahead, for maintaining columnar station or navigation

Figure 5–10. Conning Aids for the OOD

5.7.2 Lookout Instructions and Duties. The following are general requirements and duties of lookouts. Specific duties under various warfare conditions are addressed in chapters 6 through 12. Lookout responsibilities during low visibility evolutions were discussed in paragraph 5.5.

1. The lookout is to be alert and vigilant at all times.

2. Lookouts are rotated at 30 minute intervals and will test sound-powered phones at least every 15 minutes. Foul weather gear will be furnished, as required, by the OOD. Care of binoculars and foul weather gear is the responsibility of each lookout.

3. Prior to assuming the watch, oncoming lookouts shall:

   (a) Adapt vision to darkness.

   (b) Test and adjust binoculars for proper focus.

   (c) Ensure appropriate foul weather gear is available.

   (d) Test IJC.

   (e) Obtain a complete briefing of the contact situation from the lookout being relieved and CIC.

   (f) Have available and wear sunglasses during periods of glare.

OOD	• Prior to assuming the watch will: – Check intended track for the period of his watch – Read and sign the pass down the line (PDL) book, night orders and standing orders – Receive briefing by TAO/CICWO on shipping, operations being conducted, EMCON status, scheduled events, combat systems equipment status – Compare surface plot on the bridge with the briefing received in CIC – Check present and projected weather – Check engineering status • Upon assuming the watch, will be responsible for: – The safe navigation of the ship – The performance of bridge and pilothouse watchstanders and lookouts – Performing such duties as defined by the CO – Making required reports to CO, navigator, TAO, and CICWO
Quartermaster of the Watch (QMOW)	• Maintains a projected track, corrected for anticipated set and drift, of the intended ship's courses and speeds as established by the navigator • At least every 30 minutes plots both OMEGA and NAVSAT DR positions on the chart in use, informing the OOD and navigator of developing errors • Pays particular close attention to the compass comparison checks every 30 minutes, notifying the OOD and navigator immediately, if errors are noted • Examines the charts in use and make recommendations to the OOD for times when the fathometer could be used to gain useful navigation information • Maintains an up-to-date bottom contour plot when the fathometer is in use • Completes the QMOW watch turnover check list provided in figure 5–12
OOD/QMOW	• Ensures the following reports are made to the CO/navigator: – Changes in course, speed, and depth unless operating in an assigned area and remaining greater than two miles from the area boundaries – Soundings that do not correlate with the DR/fix position – Any departure from an assigned track or operating area – Any sudden or large change in set or drift – The sighting of all navigational markers such as lights, buoys, etc. – Marked changes in the weather or when visibility decreases to less than 8,000 yards – Any master gyrocompass/auxiliary gyro comparison error that is greater than 1° – Any observed malfunction to navigational support equipment (i.e., DRAI, DRT, ship's gyro, etc.) – Anytime the ship's position is doubt or the projected track's prudence is questionable – The ship's position in writing to the CO and embarked commander at 0800, 1200, and 2000

Figure 5–11. Navigation Procedures While in Open Sea

4. Lookouts shall not:

   (a) Read or study on watch

   (b) Light cigarettes, cigars, pipes or display any form of white light or open flame during darken ship

   (c) Skylark or engage in discussions with other personnel working or relaxing on deck

   (d) Be charged with any duties other than lookout while on watch.

5. Lookouts shall report all air and surface contacts, navigation lights, debris, ice, oil slicks, and other sighted lights or material no matter how insignificant.

QMOW Watch Turnover Check List

Watch _____

Date _____

Time Zone _____

Prior to relieving the watch:

_____ 1. Read the Night Order notebook

_____ 2. Review evolution in progress and ship's intentions with OOD
- a. Course _____
- b. Speed _____
- c. Time of next course/speed change, scheduled rendezvous

_____ 3. Note celestial bodies available and times of observation
- a. _____ d. _____
- b. _____ e. _____
- c. _____ f. _____

_____ 4. Determine status of electronic aids to navigation
- a. SATNAV up/down ETR _____
  - (1) Local time of next pass _____
- b. Omega up/down ETR _____
  - (1) Stations to be used for fix

a. Norway		e. La Reunion	
b. Liberia		f. Argentina	
c. Hawaii		g. Trinidad	
d. North Dakota		h. Japan	
		i. Australia	

  - (2) Stations down for maintenance or degraded performance
    ___ ETR _____ ___ ETR _____
- c. Mechanical plotters
  - (1) DRAI up/down ETR _____
    - (a) Deviation from navigator's plot _____ nm
    - (b) Time of last update _____
  - (2) DRT up/down ETR _____
    - (a) Deviation from navigator's plot _____ nm
    - (b) Time of last update _____
- d. Other NAVAIDS
  - (1) NTDS DR up/down ETR _____
    - (a) Deviation from navigator's plot _____ nm
    - (b) Time of last update _____

Figure 5–12. QMOW Watch Turnover Check List (Sheet 1 of 2)

QMOW Watch Turnover Check List (Cont.)

_____ 5. Identify other units in company for fix comparison

_____ 6. Determine wind speed _____ and direction _____

_____ 7. Read barometer

_____ 8. Check compass error (make sunline observations as available)
a. Gyro _____
b. Gyro repeater _____
c. Magnetic _____

_____ 9. Determine ship's position

_____ 10. Compare position with ship's track and DR

_____ 11. Determine set _____ and drift _____

_____ 12. Fathometer reading _____

_____ 13. Call the navigator in accordance with his instructions

_____ 14. Determine status of navigation lights

_____ 15. Determine status of steering control

_____ 16. Determine status of steering units on line/in standby

_____ 17. Determine status of EM log

_____ 18. Relieve the watch

_____ _____
On-coming Signature Off-going Signature

_____
Reviewed

File for _____ months

Destroy on _____

Figure 5–12. QMOW Watch Turnover Check List (Sheet 2 of 2)

Planned Operations/Navigation Check List

Note: This check list is for use preparatory to operations and should not duplicate steps accomplished in Pre-underway/Entering Restricted Waters Check List.

1. DEVELOPMENT PHASE
   a. Operation Orders, Sailing Directions, Coast Pilots, Fleet Guides, etc., to be used:

Name (Short Title)	Corrected	Reviewed

   b. Charts to be used:

H. O. No.	Corrected to (date)	Checked (ANAV)	Reviewed (NAV)

   c. Chart/Publication Correction File, and HYDROLANT/HYDROPAC/NAVAREAS File checked. All corrections applicable to publications and charts listed in paragraphs 1 and 2 above have been entered or brought to the attention of the navigator _____.

2. CONSTRUCTION PHASE
   a. Departure/Arrival
      (1) Time of currents for underway day/port (current chart posted)

Date: _____
Flood _____ kt at _____
Slack at _____
Ebb _____ kt at _____
Slack at _____

Figure 5-13. Planned Operations/Navigation Check List (Sheet 1 of 2)

Planned Operations/Navigation Check List (Cont.)

(2) Time of currents for mooring day/port

Date: _____
Flood _____ kt at _____
Slack _____ at _____
Ebb _____ kt at _____

2. CONSTRUCTION PHASE (Cont.):

b. Track chart prepared:

(1) Checked and marked for hazards to navigation

(2) Estimated position marked using SOA

(3) Day and night characteristics of all navigational landmarks to be sighted or used checked

(4) Fixing plan determined:

(a) Current satellite rise time data on board

(b) Track examined for hazards, turns and other key events and fix times preceding such events determined

(5) All legs of the track show both true and magnetic course and distance of the leg

(6) Track annotated to indicate next chart to be used

c. Conduct operations briefing

d. (1) Track information supplied to operations officer for MOVREP

e. (2) Final draft of MOVREP checked against track chart

3. REVIEWED: _____

Figure 5–13. Planned Operations/Navigation Check List (Sheet 2 of 2)

Pre-underway/Entering Restricted Waters Preparations Check List

Port _____ Date Prepared: _____

Date/Time of Scheduled Underway/Entering Port _____

1. PREREQUISITE: Planned Operations/Navigation Check List complete (to be completed 24 hours prior to underway) _____

2. PILOTING PLANNING
   a. Sailing Directions, Coast Pilots and Fleet Guides to be used: (list)

Name (Short Title)	Corrected	Reviewed

   b. Charts to be used:

H. O. No.	Corrected to (date)	Checked (ANAV)	Reviewed (NAV)

   (1) Largest scale available for the area _____
   (2) Charts compared to ensure navigational hazards are properly displayed _____

   c. Chart Preparation

   (1) Track laid down on charts and available on the bridge, at navigator's plot, and in CIC _____
   (2) All danger bearings and ranges plotted _____
   (3) All turning bearings and ranges plotted, allowing for ship's turning radius _____
   (4) All legs of the track show both true and magnetic course and distance of leg _____

Figure 5–14. Navigator's Pre-Underway/Entering Restricted Waters Preparation Check List (Sheet 1 of 3)

Pre-underway/Entering Restricted Waters Preparations Check List (Cont.)

(5) Day and night characteristics of all navigational landmarks properly determined and noted _____
(6) Shoal water plainly marked _____
(7) Chart shift points plainly marked _____

2. PILOTING PLANNING (Cont.)

d. Compute tides and currents and list locations _____

Display graphically
Maximum flood _____ kt at _____
_____ kt at _____
Maximum ebb _____ kt at _____
_____ kt at _____
Slack water at _____

3. ANCHORAGE

a. If proceeding to an anchorage:

(1) Location verified and depths of water checked _____
(2) All dangers clearly marked _____
(3) All turning bearings, steering or approach bearing and anchor letting-go bearing indicated and labeled _____
(4) Anchor ranges labeled _____
(5) Range circles laid out at 50, 100, 200, 400, 500, 750, 1,000 yards as appropriate for the scale of the chart in use (largest scale chart available should be used) _____
(6) Escape track laid out for use if anchor drags _____

4. BRIEFING OF NAVIGATION TEAM AND OFFICER OF THE DECK

a. Review all track charts with emphasis on navigation hazards and aids anticipated _____
b. Navigational marks and aids identified on chart and visual, radar and sonar characteristics defined to navigation team _____
c. Check gyro repeater system by simultaneous readings at the stations listed: _____

Figure 5-14. Navigator's Pre-Underway/Entering Restricted Waters Preparation Check List (Sheet 2 of 3)

Pre-underway/Entering Restricted Waters Preparations Check List (Cont.)

				Initials
Helm	_____	Bridge	_____	_____
Helm	_____	Open Conn	_____	_____
Helm	_____	CIC	_____	_____
Helm	_____	Master Gyrocompass Binnacle	_____	_____

4. BRIEFING OF NAVIGATION TEAM AND OFFICER OF THE DECK (Cont.)

   d. OOD status board filled in as applicable _____

   e. Operations folder, Night Order Book and CO standing orders available _____

   f. Ensure the following items are available _____

      (1) Bridge charts _____
      (2) CO, OOD, and lookout binoculars cleaned _____
      (3) Red flashlights _____
      (4) Pocket whistle _____
      (5) Current recognition signals _____

   g. Wind, set and synchronize the following clocks: _____

      (1) Bridge _____
      (2) Chart room _____
      (3) CIC _____
      (4) Radio _____
      (5) Commanding officer stateroom/sea cabin _____
      (6) Wardroom _____
      (7) Central Control Station

5. REVIEWED: _____

6. TO BE COMPLETED UPON STATIONING THE NAVIGATION TEAM

   a. Obtain compass check _____

   b. Ensure DRT in use for piloting is set to the 200 yards per inch scale and set up with a clean sheet of DRT paper _____

   c. Obtain fix and take sounding _____

   d. Test anchor and other inport lights, as appropriate _____

Figure 5–14. Navigator's Pre-Underway/Entering Restricted Waters Preparation Check List (Sheet 3 of 3)

Navigation Division Pre-underway Check List

Date: _____

Time of Scheduled Underway: _____

1. PREREQUISITES (To be completed 24 hours prior to underway)

   a. Planned Operations/Navigation Check List completed

   b. Pre-underway Piloting Preparations Check List completed

2. TO BE COMPLETED 12 HOURS PRIOR TO UNDERWAY TIME

   a. Gyrocompass in operation _____

   b. DRAI and DRT plotters are operating properly _____

   c. Check all radar repeater bearing and range functions _____

   d. Test searchlights and navigation lights _____

   e. Determine the magnetic variations for the local area. Apply variation and deviation to obtain magnetic compass error _____

   f. Obtain true heading _____

   g. Ensure Omega is operational. Verify by a fix, if possible _____

   h. Ensure radar, sonar, satellite navigation and fathometer are operational and, where possible, verify their accuracy _____

   i. Compute tide and current data for underway timeframe, display graphically and post for bridge and navigation personnel _____

   j. Compute and post sunrise and sunset data for day of underway _____

3. TO BE COMPLETED 1 HOUR PRIOR TO SETTING SEA DETAIL

   a. Obtain ship's heading from chart and determine heading error for: _____

      Master gyrocompass _____

      Auxiliary gyrocompass _____

Figure 5–15. Navigation Division Pre-Underway Check List (Sheet 1 of 2)

Navigation Division Pre-underway Check List (Cont.)

3. TO BE COMPLETED 1 HOUR PRIOR TO SETTING SEA DETAIL (Cont.)

   b. Clean and prepare bridge for getting underway including:

      Test searchlights _____

      Clean windows _____

      Test life ring floatlights and megaphone _____

   c. Ensure navigational equipment is available for use and is operational: _____

      (1) Parallel motion protractor _____

      (2) One-arm protractor _____

      (3) Three-arm protractor _____

      (4) Plotting equipment _____

      (5) Pencils _____

      (6) Speed strips for chart scales to be utilized _____

      (7) Fathometer loaded with sufficient paper _____

      (8) Maneuvering boards _____

      (9) Stadimeter _____

4. REVIEWED: _____

Figure 5-15. Navigation Division Pre-Underway Check List (Sheet 2 of 2)

Navigation Division Entering Port Check List

Port _____ Date: _____
ETA: _____

1. PREREQUISITES: (To be completed 24 hours or 100 miles before entering restricted waters, whichever is greater)

ENTERING RESTRICTED WATERS FROM SEA PREPARATIONS CHECK

2. CO, OOD, CIC and engineer notified when the following distances from land are reached:
   - 50 miles _____
   - 12 miles _____
   - 4 miles _____

3. Within 50 miles/4 hours from landfall:
   a. Approved track charts for bridge, navigation and CIC plots available _____
   b. If proceeding to an anchorage ensure location is verified and clearly marked on OOD's, navigator's and CIC charts and that danger and anchor bearings and ranges are clearly labeled. Lay our escape track for use if anchor drags _____
   c. Determine and post true heading of pier _____
   d. Ensure the following are readily available: _____
      (1) Approved harbor charts _____
      (2) Inport colors _____
      (3) Binoculars (cleaned) _____
   e. Obtain and post recognition signals (as applicable) _____

4. When approaching 10 miles from restricted waters:
   a. Synchronize bridge, chartroom, radio, CIC and central control clocks _____
   b. Obtain a radar fix and compare to ship's position fixed by other means _____
   c. Test navigation lights _____
   d. Obtain an azimuth and determine gyrocompass error. Post results _____
   e. Verify the magnetic variation for the area from current publications. Apply variation and deviation to the magnetic head and determine error as compared to the gyrocompass _____
   f. Bridge preparation _____
      (1) Clean windows _____
      (2) Test life ring floatlights _____
      (3) Test megaphone/MC _____
      (4) Alidades in place _____
      (5) Compass bearing ring/holders in place _____

5. REVIEWED: _____

Figure 5–17. Navigation Division Entering Port Check List

CIC Pre-underway Check List

1. TO BE COMPLETED 24 HOURS PRIOR TO UNDERWAY:

   a. Light off and check operation of AN/SPS-55
   b. Light off and check operation of all remote repeaters
   c. Break out charts and check that all Notice to Mariners corrections are made. Ensure all labeling of points, hazards, etc.; ensure track agrees with navigator's charts
   d. Check out DRT operation
   e. Post task organization call signs and communications circuits
   f. Conduct radio checks in accordance with effective operational order
   g. Patch and label remote speakers
   h. Energize and check out ESM equipment

2. TO BE COMPLETED 12 HOURS PRIOR TO UNDERWAY:

   a. Publications broken out and inventory check list prepared
   b. Logs opened and dated at each applicable station
   c. Charts down in order of use
   d. PMP arms mounted and aligned
   e. Set up and check sound-powered phones at all appropriate stations
   f. Grease pencils filled and placed in holders with grease rags at each scope and status board
   g. Pencils, parallel rulers, dividers, and compasses broken out and checked
   h. DRT paper down (three sheets)
   i. CIC secured for sea
   h. Conduct radio checks as appropriate

3. TO BE COMPLETED 4 HOURS PRIOR TO UNDERWAY:

   a. Check message boards and current operations board for possible last minute changes
   b. Conduct radio checks as appropriate

4. TO BE COMPLETED 2 HOURS PRIOR TO UNDERWAY:

   a. Conduct radio checks as appropriate

Figure 5-16. CIC Pre-Underway Check List

Station	Location	Sound-Powered Circuits
Normal Underway Stations		
Port Lookout	Open bridge	JL
Starboard Lookout	Open bridge	JL
After Lookout	03 level aft	JL
Additional Stations Manned When Directed		
Forward Low Visibility Lookout	Forecastle (eyes of ship)	None
Forward Lookout Phone Talker	Forecastle	1JV
After Low Visibility Lookout	Fantail	None
After Lookout Phone Talker	Fantail	1JV

Figure 5–18. Lookout Station Assignments

5.7.3 Search Techniques. Lookouts shall be assigned normal search sectors as follows:

STATION	SEARCH AND REPORTING SECTOR	
	From	To
Starboard lookout	350°R	130°R
Port lookout	230°R	010°R
After lookout	120°R	240°R

Prior to entering a high threat area, the OOD shall direct that lookouts be augmented by quartermasters, signalmen, and additional after lookouts to reduce each search sector to 60° less.

5.7.4 Qualification of Lookouts. Ship's personnel shall not be placed on watch as lookouts until qualified by the CICO who maintains qualification records in individual service records. Personnel under instruction shall be under the supervision of a qualified lookout. To qualify as a tactical lookout the individual shall be able to:

1. Demonstrate proper care, use, and stowage of sound-powered phones, binoculars, and other equipment assigned.
2. Demonstrate prescribed visual surface and air search procedures.
3. Describe salient detection features of low-flying aircraft.
4. Explain lookout duties and responsibilities during normal and reduced visibility.
5. Demonstrate proper initial contact and amplifying report procedures.
6. Demonstrate proficiency in identifying U.S. and allied naval ships and aircraft by type.

7. Demonstrate proficiency in identifying threat surface, air, and subsurface craft.

8. Demonstrate proficiency in identifying common types of commercial ships and general characteristics.

9. Demonstrate ability to determine position angle, relative bearing, and target angle.

10. Pass a medical examination certifying visual and aural acuity.

11. Special qualifications for lookouts stationed during periods of low visibility, in addition to the above, are contained in paragraph 5.5.

5.7.5 Lookout Training. Lookout training will be the responsibility of the CICO.

5.8 OPERATIONS IN EXTREME ENVIRONMENTAL CONDITIONS

5.8.1 General. Cold weather operations require modifications to standard procedures which must be made in preparing for such operation. The following are examples of the effects/results of cold weather:

1. Reduced visibility, due to prevalence of fog, frost smoke, blowing snow, and long periods of darkness and semidarkness

2. Special hazards to navigation, such as icebergs, bergy-bits, growlers, storms of long duration, and very few recognizable landmarks

3. Magnetic storms, and auroral activity effects on gyro and magnetic compasses when operating in extreme latitude

4. Cold weather damage to equipment and personnel

5. Poor radio communications.

5.8.2 Personnel Safety Precautions. Before entering adverse climates crews shall be at maximum readiness because adverse conditions make routine functions difficult. The primary dangers include: chapping and sunburn, frostbite and wind chill, snow blindness, lung frosting (especially during deep mouth breathing caused by exertion), immersion, freezing of flesh by gasoline and other substances which remain liquid at below freezing temperatures, and falling on icy decks and ladders.

5.8.3 Classifications and Descriptions of Ice. Figure 5–19 contains the various classifications of ice and their description.

5.8.4 Ice Detection.

a. About 50 percent of all ice encountered will first be detected by lookouts. However, in low visibility clear detection and pack ice is difficult. Prevailing weather conditions shall dictate a rotational rate which is not to exceed 30 minutes on station.

Classification	Description
Sea Ice	• Formed from saltwater
Fast (Coast) Ice	• Sea ice of varying width which remains fast along the coast • Generally remains in the position where formed • Thickness and hardness depends on age and temperatures of surrounding air and water
Icebergs	• Large masses of floating ice, only approximately 10% of which is above water • Derived from glaciers, glacier tongues or ice shelves • Unless stranded, are not found in water less than 10 fathoms • Irregular type-produced by glaciers • Flat-topped, straight-sided type-broken off from an ice shelf • Pieces falling from an iceberg (calving) produce separate icebergs
Bergy-bit	• An iceberg about the size of a house
Growler	• An iceberg which is smaller than a bergy-bit
Polar Ice	• Ice in the Arctic or Antarctic which never thaws
Pack Ice	• A large mass of sea ice, consisting of various floes, pressure ridges and openings

Figure 5–19. Classification and Description of Ice

In polar coastal regions the phenomena known as the mirage effect occurs causing multiple images to be seen, each inverted to the other. Landfalls may be made many miles before they are expected.

A reliable sign of the approach to pack ice, especially from leeward, is the somewhat abrupt smoothing of the sea in a fresh breeze and the more gradual lessening of the swell. Another is the appearance of a yellowish glare on ice blink in the sky above an ice field. If clouds are present, the blink is whiter. Reflection of light from snow, whether on land or ice, is white and is called "snow blink."

The presence of seals, walruses, or birds may indicate ice. During warmer months when the wind is blowing from the direction of the ice, a low-lying fog or stratus (100 to 300 feet) extending from 5 to 50 miles from the edge of the ice may be the first warning of ice.

b. Radar performance in ice detection varies with hardness of the ice or its state of deterioration. Generally, new ice is a better reflector than old ice. Growlers, bergy-bits, and

brash (small fragments not more than 6 feet across) are the most difficult to detect and normally will not appear on radar at ranges greater than 6,000 yards.

The above water, cross-sectional area of ice is the major factor in determining its detectability by radar. Large ice fields may be detected at over 8,000 yards but may be mistaken for sea return. Pack ice is distinguished from sea return by the greater range of detection and by the outline which retains the same shape with each sweep. However, pack ice may not give a sharp outline beyond 4,000 yards. A large iceberg (230 feet high) may be detected at a range of about 28 miles, a smaller iceberg (90 feet high) at about 18 miles, while fairly large growlers which float low in the water may not be detected in even a calm sea at 1 mile. On radar the iceberg presentation shows a shadow behind the iceberg since radar pulses are stopped by the heavy ice mass. The following operator adjustments to the AN/SPS-55 radar may improve detection and tracking.

1. Receiver Gain. Vary the radar receiver gain to distinguish between ships and icebergs in ice cluttered areas.

2. Radiated Power. Reduce radiated power to increase ice definition (resolution), keeping in mind this will reduce detection range.

3. Sensitivity Time Control (STC). Properly regulate to reduce sea and ice clutter at short ranges while not affecting long-range radar echoes. This control can be used to distinguish a lead through pack ice.

5.8.5 Capabilities and Limitations of Voice Communications Equipment. In higher latitudes voice communications are erratic and unreliable. Erratic communications are caused by auroral zones, ionospheric disturbances, and the proximity of the magnetic pole. The affects of ionospheric disturbances, magnetic poles, and auroral zones are:

1. Fading becomes extreme, the highest usable frequency decreases, propagation becomes erratic, and a wide diversion is apparent in direction finder bearings.

2. A few minutes after the first fading, magnetic disturbances penetrate the lower ionospheric levels and frequency absorption increases sharply and in turn blacks out higher frequencies.

3. As the higher usage frequency drops and lowest useful high frequencies rise, the entire band of high frequencies may disappear. The blackout condition may last for only a few minutes or for several days and may seriously disrupt radiotelegraph, radioteletype, and radiotelephone communications.

4. Return to normal conditions may be fastest at lower frequencies; but blackouts on medium frequencies below 2 MHz may last several days. At times, however, frequencies much higher than those customarily used may be useful during initial recovery.

5. Propagation on frequencies below 200 kHz may actually improve during blackout.

5.8.6 Sonar Operations in Artic Waters. The design of the AN/SQS-53 makes it useful in arctic operations. With use of the trainable beam, it should detect the submerged portion of icebergs and floes. Although not a good sonar target, icebergs can usually be detected in time to take avoiding action. Icebergs may be detected passively since they may produce loud noise (caused by release of air bubbles under pressure) similar to high-speed screws on a ship.

Additionally, a disintegrating iceberg will produce a cracking sound as small pieces break off or a thunderous roar as a large piece falls into the water. Growlers will produce noise as they bob up-and-down in the water.

5.8.7 Navigation in Upper Latitudes. Polar navigation is very difficult. Since most polar regions have never been accurately surveyed, charts lack detail, are few in number, and tend to be inaccurate.

Reports of gyro error should be received frequently by CIC from navigation personnel. During periods when gyro errors cannot be obtained, dead reckoning tracer (DRT) plots should be regarded with suspicion. The gyro compass is generally reliable to latitude 70°. The error increases and becomes more erratic at higher latitudes, with errors as large as 27° reported at latitudes greater than 82°.

The DRT is designed for use below latitude 70°. With the application of a few calculated corrections, the dead reckoning analyzer (DRA) can be made to work satisfactorily in higher latitudes. To determine latitude a known error can be introduced. For instance, between 70° and 75°, set the latitude disk back 5°, making the DRA read 65° instead of 70°, 66° instead of 71°. The longitude will still be in error because the distance between meridians is a function of the cosine of the latitude, and the DRA latitude was 5° in error. When the direction of travel is generally North and South, no appreciable error will develop.

5.8.8 Air Control. Antisubmarine air controllers (ASACs) must recognize several complications imposed upon the pilot by artic conditions. Violent storms appear with little warning, extensive fog conditions, icing hazards, and low overcasts restrict flight operations.

Inadequate horizontal magnetic fields in high latitudes and rapidly fluctuating variation often incapacitate the magnetic compass so vectors given aircraft may produce tracks in error by tens of degrees. ASAC's must be alert to changing variation and be prepared to turn aircraft by timed turns, giving the pilot orders to start and stop the turn in place of headings.

5.8.9 Preservation and Operation of External Equipment. Cold weather produces icing of elements, condensation, lubrication problems, breakage due to low temperature, installation and maintenance difficulties.

a. General. All equipment must be winterized. A check must be made to ensure all winterizing techniques have been applied such as renewal of grease and oil, use of low temperature lubricants, and filling of preheating equipment. Slow moving mechanical parts such as shafts and bearing surfaces are buffed and polished and should not be lubricated unless this is found to be absolutely necessary, and then it should be done most sparingly. Preheaters shall be used whenever possible but are considered mandatory when the temperature falls below minus 35°F. The practice of a long warm-up period with no-load or light-load conditions is mandatory. Also, equipment operated in spaces with varying temperatures shall be left in standby with all tube filaments burning and space heaters energized during periods of nonoperation.

b. Warm-Up Period. For communications and radar transmitters, a long warm-up period by tube filament heating is to be used. The periods of warm-up time prescribed in the equipment handbook shall be adhered to and increased in conditions of extreme low temperature.

c. Antennas. All facilities must be utilized to prevent icing on the antenna, including pedestal space heaters and warm air blast directed through the guides, when practicable. Ice which has formed on antennas shall be removed from strain insulators to prevent excessive transmission loss. When first rotating an antenna it shall be at slow speed. In case of high winds, the antenna must be stowed with the least frontal area presented to wind.

d. Flexible Cables. Rubber covered flexible cables become stiff at temperatures lower than minus 10°F. Sharp bends in cables are to be avoided since insulation becomes brittle and is likely to crack and shatter rather than bend.

e. Pushbuttons. To reduce problems experienced in the selection of channel on pushbutton type equipment, set the equipment as required before entering arctic regions.

f. Moisture and Snow. Equipment which is not in regular use must be heated periodically to dry out moisture from components. Equipment which is used in exposed areas shall be covered with canvas prior to returning it to a warm space inside the ship. Additionally, equipment must be thoroughly dried to remove all traces of condensation. Snow proof covers must be provided for all equipment in exposed areas.

1-N3

DEPARTMENT OF THE NAVY
COMMANDER NAVAL SURFACE FORCE
UNITED STATES PACIFIC FLEET
SAN DIEGO, CALIFORNIA 92155-5035

COMNAVSURFPACINST 3530.2B
N3212:NPC 242
JUN 01 1988

COMNAVSURFPAC INSTRUCTION 3530.2B

Subj: NAVIGATION STANDARDS AND PROCEDURES

Ref: (a) U. S. Navy Regulations 1973
(b) OPNAVINST 3120.32B
(c) COMNAVSURFPACINST 3530.3B
(d) COMNAVSURFPACINST C3501.6D

Encl: (1) Standard Navigation Planning Checklist
(2) Standard Navigation Briefing
(3) Navigation Checklist

1. Purpose. To establish minimum navigation standards and procedures for NAVSURFPAC ships in amplification of references (a) and (b). Reference (c) deals primarily with open ocean and tactical navigation, whereas this instruction principally addresses piloting and navigation in restricted waters. Restricted waters should be interpreted to include those waterways associated with leaving/entering port, transits of narrows or straits, and operating in coastal waters in close proximity to obstructions and shoals. This instruction takes precedence over reference (c) in matters concerning restricted water navigation.

2. Cancellation. COMNAVSURFPACINST 3530.2A.

3. Duties and Responsibilities

a. Commanding Officer. The commanding officer shall require the navigator to develop a plan for safe and accurate navigation including piloting. This plan shall be approved by the commanding officer prior to getting underway or approaching restricted waters.

b. Executive Officer. The executive officer shall exercise overall coordination of all watch personnel, and particularly the navigation team, ensuring that the navigator is properly trained and has formed an effective piloting team. The executive officer shall provide guidance to the navigator in training the navigation team through personal monitoring, paying particular attention to the coordination of the CIC and the bridge navigation plots and the integration of information of navigational value from all sources. The executive officer shall be prepared to direct corrective action in navigation team performance, and advise the commanding officer and OOD, as may be appropriate, to ensure their acknowledgement of recommendations and statements of danger by the navigation team.

c. Officer of the Deck (OOD) and Conning Officer. The OOD and conning officer must keep the navigation team informed of their intentions and objectives well in advance of execution. If the OOD or conning officer does not agree with the navigator's recommendations, a report of the fact shall be made to, and acknowledged by, the commanding officer.

d. Navigator. The navigator is responsible for the safe navigation and piloting of the ship and, in furtherance of the responsibilities specified in reference (b), shall provide direct supervision and control of the navigation team. The navigator must refrain from becoming excessively involved in any one aspect of the navigation team's functions which might impede his ability to evaluate the ship's proximity to hazards or to proficiently and rapidly identify aids to navigation. The navigator should rotate team members for cross-training with the caveat that the training of less experienced members in the more demanding positions shall not be accomplished at the risk of safe navigation.

4. Qualifications and Training

a. Navigator. Minimum qualifications of the navigator shall be:

(1) Surface designated 1110 or, if 13XX officer assigned, qualified as OOD underway.

(2) Qualified OOD underway in current ship with a minimum of two years' experience at sea.

ENCLOSURE (1) 97

(6) Fix Times and Plotting Fixes. The bridge and CIC navigation teams shall use identical fix times. Each shall plot the other station's fix at approximately three-fix intervals, when the fix interval is two minutes or more.

(7) Coordination of Chart Shift. Bridge and CIC shall coordinate chart shifts so that both are not shifted at the same time and so that they do not require shifting during or at the time of an impending turn.

(8) Navigator and OOD/Conning Officer Coordination. Navigation information shall be reported to the OOD/conning officer in the same format from both bridge and CIC. The navigator shall make recommendations in a clear and positive manner. In those instances in which the navigator does not concur with actions of the conning officer, these facts must be made known to, and acknowledged by the commanding officer.

6. Implementation

a. Maintaining the highest navigation standards which are demanded of professional mariners must be a multi-faceted effort in which supervision and enforcement will play a large part. Accordingly, group/squadron commanders shall maintain staff navigation assistance/validation (NAV) teams. The staff NAV team shall conduct short-notice or unannounced annual underway observations of the navigation performance in restricted waters for each ship for which the group/squadron commander is ISIC, to include overall navigation team performance, PQS progress, and record/log keeping utilizing enclosure (3). Ships that commence operations after extended periods in port (e.g., ROH) shall, where feasible, be accorded scheduling priority for navigation check rides. For scheduling purposes, ships that have undergone refresher training within the past six months may be accorded lower priority. Upon completion of all check rides, a numerical grade will be assigned and the completed check list forwarded to the observed ship with a letter informing the commanding officer of the grade assigned, significant observations and corrective action (if any) required.

b. Upon satisfactory completion of the check ride, ships are to report the exercise numerical grade via a UNITREP Part III TRADA entry. The TRA entry is to be made in the same manner as competitive exercises and indicated under the miscellaneous (misc) heading.

S. S. CLAREY
Deputy and
Chief of Staff

Distribution:
SNDL Parts 1 and 2

26A2	Amphibious Group PAC
26V2	Landing Force Training Command PAC
26FF	Mine Warfare Inspection Group
26OOO	Mobile Training Team
28B2	Cruiser-Destroyer Group PAC
28C2	Surface Group and Force Representative PAC
28D2	Destroyer Squadron PAC
28E2	Surface Squadron PAC
28G2	Mine Squadron and Division PAC
28I2	Craft of Opportunity Mine Squadron and Unit PAC (COOPMINERON 11 only)
28J2	Service Group PAC
28L2	Amphibious Squadron PAC
29A2	Guided Missile Cruiser PAC (CG) (CGN)
29E2	Destroyer PAC (DD), 963 Class
29F2	Guided Missile Destroyer PAC (DDG)
29G2	Guided Missile Frigate PAC (FFG)
29H2	Frigate PAC (FF), less 1040/1097 Class
29J2	Frigate PAC (FF), 1040/1051 Class
29K2	Frigate PAC (FF), 1052/1077 Class
29L2	Frigate PAC (FF), 1078/1097 Class
29R2	Battleship PAC (BB)
29AA2	Guided Missile Frigate PAC (FFG) 7 Class
29BB2	Guided Missile Destroyer (DDG) 993 Class

30A2	Minesweeper, Ocean (Non-magnetic), PAC (MSO)
31A2	Amphibious Command Ship PAC (LCC)
31B2	Amphibious Cargo Ship PAC (LKA)
31G2	Amphibious Transport Dock PAC (LPD)
31H2	Amphibious Assault Ship PAC (LHA) (LPH)
31I2	Dock Landing Ship PAC (LSD) 41 Class
31J2	Dock Landing Ship PAC (LSD)
31M2	Tank Landing Ship PAC (LST)
32A2	Destroyer Tender PAC (AD)
32C2	Ammunition Ship PAC (AE)
32G2	Combat Store Ship PAC (AFS)
32H2	Fast Combat Support Ship PAC (AOE)
32N2	Oiler PAC (AO)
32Q2	Replenishment Oiler PAC (AOR)
32S2	Repair Ship PAC (AR)
32X2	Salvage Ship PAC (ARS)
32KK	Miscellaneous Command Ship (AGF) (CORONADO only)
32QQ2	Salvage and Rescue Ship PAC (ATS)
C58B	Surface Warfare Officers School Command Pacific
FT35	Amphibious School (Coronado only)
FT43	Surface Warfare Officers School Command

STANDARD NAVIGATION PLANNING CHECKLIST

1. Preliminary Planning

a. Publications on Board, Corrected and Reviewed

(1) Coast pilots

(2) Fleet guides

(3) Sailing directions

(4) Light list/list of lights

(5) The port directory

(6) Appropriate OPORDS

(7) OPAREA instructions

(8) Radio NAVAIDS

(9) Notice to mariners, local notice to mariners, NAVAREA HYDROPACS

b. Select charts/plotting sheets based on a review of the Catalog of Nautical Charts, HO PUB 1N. Review requirement for classified charts. Ensure all chart corrections entered.

2. Open Ocean Transit Planning

a. Track Selection (Rhumbline/Great Circle/Combination)

(1) Environmental considerations

(2) OTSR recommendation

(3) ETA/SOA considerations

(4) Review of pilot charts

b. Track Plotting on Charts/Plotting Sheets

(1) Conforms to:

(a) Recommended routes of coast pilot/sailing directions or OTSR recommendations.

(b) Operational requirements

(c) Desires of CO/OTC

(2) Clear of hazard/restricted/prohibited areas

c. Radar Landfall Predictions

d. Departure/En route/Arrival Lighted NAVAIDS List

(1) Name

(2) Nomenclature

(3) Characteristics

(4) Physical description

(5) Maximum range of visibility computed

(6) Time and bearing of expected sighting/losing

3. Restricted Waters Transit Planning

a. Lighted NAVAIDS List

(1) Name

(2) Nomenclature

(3) Characteristics

(4) Physical description

(5) Maximum range of visibility computed

(6) Time and bearing of expected sighting/losing

b. Chart Preparation

(1) All charts covering the area compared, piloting charts selected

(2) Hazards (shoals, gunnery practice areas, etc.)

(a) Displayed on all charts

(b) Prominently marked

(c) Marked with danger bearing/range

(3) Visibility arcs of all lights plotted. Use value computed above.

(4) NAVAIDS marked and labelled with identical bridge/CIC labels for radar points (labels annotated in radar and visual bearing books for permanent reference).

(a) Visible and distinctive

(b) Close to the track (radar targets beyond minimum radar range)

(c) Provide bearing spread

c. Track

(1) Laid down on all charts (bridge/CIC/OOD) of the area for comparison

(2) In accordance with recommended track per fleet guide, sailing directions, coast pilots, etc.

(3) Track allows sufficient maneuvering room for possible errors in position of charted hazards.

(4) Does not cross danger bearings/ranges

(5) True/magnetic courses and distance marked on each leg.

(6) Time of sightings for lights marked along with bearing.

(7) Turn bearings and ranges for every turn

(a) Marked from a fixed NAVAID

(b) Sufficient bearing/range rate

(c) Allows for advance and transfer

(8) Danger bearings and ranges

(a) Each hazard marked

(b) Taken from fixed NAVAIDS

(c) Provides sufficient warning of danger

(9) Danger soundings

(a) Highlighted on either side of track

(b) Provides sufficient reaction time before grounding

(c) Depth below keel Danger Sounding, equivalent to charted Danger Sounding, marked on chart

(10) Preselected points for chart shifts indicated.

(11) Track reviewed and an independent check of the track on all charts made.

d. Advance computations

(1) Sunrise/set, moonrise/set

(2) Tides

(3) Tidal currents

(4) Tides and currents plotted against time

1. Navigation Equipment

a. Compasses

(1) Gyro Compass

(a) Determine error

(b) Check repeater benchmark alignment and agreement between repeaters. Note errors for future use.

(2) Magnetic Compass

(a) Within acceptable limits

(b) Deviation tables posted for ready reference by OOD and navigation plotter

b. Position Display Equipment (as applicable)

(1) DRA/DRAI

(a) Verify operations

(b) Insert initial position

(2) DRT - Verify operation

(3) CRT plot displays

(a) Verify operation

(b) Insert initial position

(4) Fathometer

(a) Verify operation

(b) Set to trace mode for restricted water transit

(5) Pit Log - Verify operation

c. Optical Equipment. Verify operation/alignment of:

(1) Sextants

(2) Stadimeters

(3) Alidades

(4) Azimuth/bearing circles

(5) Binoculars

(6) Night vision sights

d. Electronic Equipment. Verify operation/alignment of:

(1) Navigation radar/repeaters. Record errors for future use.

(2) Omega/Loran

(a) Ensure propagation/lattice tables are on board.

(b) Plot and compare position.

(3) NAVSAT. Plot and compare position.

(4) Other electronic navigation equipment. Plot and compare position.

(5) Bridge to bridge Radio.

e. Plotting Equipment. Verify operation/alignment of:

(1) PMP's

(2) Three-arm protractors

(3) Parallel rulers

(4) Navigation computers/calculators

f. Timepieces. Verify operation of:

(1) Chronometers

(2) Stop watches

(3) Comparing watches