

Extract from P&O Ferries Fleet Regulations -  
Bridge Passage Plans and Bridge Watchkeeping, Best Practice

## Bridge, Passage Plans

### 1 PREPARATION & REVIEW OF PASSAGE PLAN

Passage Plans for each vessel's normal route will generally be pre-prepared, and a common set of plans may be agreed between the Ship Manager and Senior Masters of the ships on a particular route.

A copy of the agreed plan for each route is to be lodged with the Sector Fleet Department, so that it can be passed to other ship's in the fleet in the event that they are deployed on that route at some future date.

The Master shall designate an officer to review and maintain normal service passage plans appropriate to the latest relevant information. When proceeding to refit/repairs or to a destination outside the normal service ports, the designated officer shall prepare a passage plan for approval by the Master. This plan shall be briefed to deck officers by the Master together with other guidance/instruction regarding the voyages to and from refit.

The OOW shall ensure that the passage plan is amended appropriate to any information he receives whilst on watch.

In the event of any diversion, such as attending a ship in distress or re-routing to another port, the Master is to ensure that an amended passage plan is prepared and verified with least possible delay.

### 2 THE PLAN

The plan should include:

- navigation from berth to berth with prudent margins of safety.
- a list of the charts to be used and navigational publication references relevant to the route;
- a list of the planned courses, distances, and waypoints for course alterations;
- abort points for phases of critical navigation such as entering a confined channel, port approach, harbour entry or commitment to berthing manoeuvre.
- information on safe speed in relation to avoidance of wash/wake generation and the safety of small craft and persons close to the shore;
- Blind pilotage information;
- parallel index plans, transit marks, clearing bearings and distances;
- instructions and details re pre-set mapping on radar displays, and electronic chart displays;
- positions where a change of machinery status is required, (e.g. main engines, alternators, steering motors);
- details of reporting/calling points, and procedures;
- radio navigation information and weather services;
- notes on pilotage and local traffic control, and local conditions;
- contingency plans for alternative action in the event of severe weather conditions or an emergency necessitating abandonment of the normal plan, including safe anchorages;
- agreements on navigation made between operators in any local users committee for the purpose of promoting safe navigation by those party to the agreement;
- any additional navigational instructions and best practice particular to the route.

Where vessels have electronic chart systems the written plan should also include confirmation that all possible passage information has been placed in the system and details of the controls in place against inadvertent alteration of such information.

Passage Plans are controlled documents and all pages, including any photocopies of sections of chart, are to include a status footer showing the issue number, date, (or date of review), and the initials of one of the Masters who have approved the plan for the route. The plan is to be reviewed regularly and updated as necessary for any changes in circumstances.

When proceeding to refit or to a port different from the regular schedule a specific plan for that voyage is to be prepared in ample time to allow the ordering and receipt of any additional charts and publications required. The passage plan is to be fully briefed to all bridge officers by the Master.

In the event that circumstances such as traffic density or heavy weather dictate a substantial deviation from the plan, the OOW must ensure that the proposed new track is safe and proper in every respect. It is to be plotted on the chart and the ship's position properly monitored.

Areas into which the ship may not safely proceed are to be indicated on charts.

ENC sub-menu selection shall ensure display of these areas and soundings as follows:-

Sub	menu	depth shades	four shades
		shallow contour	5 metres
		deep contour	15 metres
		safety depth	10 metres

Passage Planning shall maintain a planned distance of at least 2 miles off any wind farm, where safe to do so.

This "safe water" is required due to radar and ARPA performance degradation which might result in failure to detect a target until it is clear of the wind farm with subsequent plotting difficulty due to ARPA target swap.

Significant degradation of radar performance should be assumed in close proximity to any wind farm

## Bridge Watchkeeping, Best Practice

### 1 COMPLIANCE WITH LEGISLATION

All Company ships are to comply with all current legislation on navigation and prevention of collision as required by;

- (a) International law
- (b) IMO
- (c) Laws of the ship's flag state
- (d) Local harbour regulations or by-laws
- (e) Fleet Regulations
- (f) Senior Master's Standing Orders.

All Deck Officers are to have a thorough understanding of all fleet regulations and legislation regarding their responsibilities for safe navigation at all times.

Masters are to oversee safe navigation as conditions require and are to monitor watchkeeping standards from time to time by any means available.

Company ships are to be navigated in compliance with all regulations and company best practice at all times.

### 2 WATCHKEEPING

**BRIDGE WATCHKEEPING IS A HIGHLY IMPORTANT ACTIVITY. THE WATCHKEEPER'S DILIGENCE HAS DIRECT BEARING UPON THE SECURITY OF THE SHIP AND SAFETY OF ALL THOSE ON BOARD AND IN ADJACENT WATERS.**

**IT IS A DEMANDING ACTIVITY AND MUST NOT BE UNDERVALUED.**

**WATCHKEEPING REQUIRES CONTINUAL SELF-MOTIVATION, SELF-DISCIPLINE AND THE HIGHEST STANDARDS OF PROFESSIONALISM BY THE WATCHKEEPING OFFICER AND ALL MEMBERS OF THE BRIDGE TEAM.**

The main purposes of watchkeeping are to ensure the safety of life and property, the prevention of pollution of the marine environment and the proper operation of the ship in its commercial service.

The watch system shall be arranged in accordance with STCW A-VIII/1, such that the efficiency of the watchkeeping Officer and watchkeeping Ratings is not impaired by fatigue and they are sufficiently rested and otherwise fit for duty;

Masters and Officers are expected to make intelligent interpretation of the guidance in this document and other Fleet Regulations, Marine Guidance Notes and professional Bridge Procedures guides. Nothing supersedes the application of basic principles incorporated in Certificates of Competency, application of the International Regulations for Prevention of Collision at Sea and the practice of good seamanship in all circumstances. In particular: -

- (a) The nature of a regular ferry operation requires constant vigilance. Masters and Officers must be guided by the principle that there is no substitute for unremitting attention to detail and observance of the highest standard of professional competence ;
- (b) It must not be assumed that other vessels are necessarily being navigated in a responsible and competent manner.

At all times when the ship is under way or at anchor, the Bridge must be in the charge of a duly qualified and appointed Deck Officer, the Officer of the Watch (OOW), or the Master.

The OOW must not leave until properly relieved by a Deck Officer or the Master

The OOW shall give watchkeeping personnel all appropriate instructions and information which will ensure the keeping of a safe watch, including a proper look-out. The OOW, or Master if he has the

con, shall advise the bridge team of his navigational intentions when setting course, altering course or slowing down so as to improve their situational awareness and encourage effective monitoring.

The OOW shall not be assigned or under-take any duties which would interfere with the safe navigation of the ship.

In a ship with separate chartroom the OOW may visit the chartroom, when essential, for a short period for the necessary performance of navigational duties, but shall first ensure that it is safe to do so and that proper lookout is maintained

## 2.1 Watchkeeping Failures

Analysis of marine accidents worldwide suggests that 80% are the result of human error. The most common causes of grounding are identified as:-

- reliance on radar positions without cross-checking
- neglecting use of echo sounder and alarm
- absence of on-plotting projected position or track
- improper reliance on floating aids to navigation
- failure to maintain a proper lookout

Positions obtained by electronic means should be verified by another method. In many circumstances good situational awareness will be achieved by proactive visual monitoring of leads, transits and clearing marks.

## 2.2 Calling the Master

**THE OFFICER OF THE WATCH MUST NOT HESITATE TO CALL THE MASTER IMMEDIATELY IN ANY POTENTIALLY HAZARDOUS CIRCUMSTANCES OR IF IN ANY DOUBT WHATSOEVER ABOUT THE SAFETY OF THE SHIP FOR ANY REASON OR THE SAFETY OF OTHER CRAFT OR PERSONS.**

Circumstances in which the OOW should inform the Master include the following:-

- if restricted visibility is encountered, anticipated or suspected;
- If heavy traffic conditions or any unusual or unlawful manoeuvres by other vessels are causing concern;
- If difficult traffic conditions are anticipated or developing such as to cause concern;
- if difficulty is experienced in maintaining track;
- in the event of breakdown of a main engine, steering gear or any other essential machinery or navigational equipment;
- in the event of failure of any essential navigational equipment or any course, speed or positional input to navigational equipment;
- in the event of a near miss situation including any potential swamping of a small craft or other unplanned circumstance or close quarter situation;
- if distress, urgency or safety radio messages are received and concern events in the ship's operating area;
- on failure to make a landfall or to sight a navigation mark or to obtain soundings by the expected time, or if unexpectedly, navigation marks are sighted or a change in sounding occurs;
- in heavy weather if in any doubt about the possibility of weather damage or injury;
- if any circumstance necessitates a course contrary to an applicable Traffic Separation Scheme or a significant deviation from the track marked on the navigational chart;
- when a deviation from voyage plan will take the ship the wrong side of a navigation mark;

- if there is a significant change in the ETA;
- when at anchor, if any doubt arises over maintenance of the anchorage position or proximity of another vessel;
- as soon as it becomes apparent that the Master has not arrived on the bridge as expected following previous advice of approach to a pilotage area, way point, or port approach;
- In case of actual or potential pollution incident;
- When a manual or common response fire alarm is received on the bridge;
- When there has been an accidental emergency transmission via the GMDSS station.

In addition to calling the Master, the OOW must take whatever immediate action may be necessary for the safety of the ship, other craft or persons in these circumstances.

The master and/or officer of the watch must take positive action to ensure the safety of others if ever in any doubt whatsoever about a near miss situation or potential swamping of a small craft. Such action must positively verify the safety of others. Additionally the officer of the watch must not hesitate to take positive action before the arrival of the master on the bridge.

In the event that the Master is acting as the OOW he must call another Deck Officer to assist when circumstances require. The Master must call another Deck Officer to the bridge in good time before approach to a pilotage area.

### 2.3 Handing over the Watch

The Master or OOW should not hand over to a relieving Officer: -

- If he has any reason to believe that the latter is apparently under any disability which would prevent him from properly fulfilling his duties; and
- Until he is certain that he is fully aware of the navigational situation.
- Until the latter is fully adjusted to the prevailing light conditions and has gained night vision.
- If there is a developing traffic situation.

When the Master is on the Bridge, irrespective of whether or not he has "the con" the handover of OOW is to be effected in a proper and formal manner and in accordance with applicable Fleet Regulations.

On completion of the handover the Officer who has been relieved will ensure that the period during which he held the navigational watch is entered in the Deck Log.

The OOW will not hand over the watch to an officer under training.

Officers under training may act in the capacity of assistant to the OOW, but the OOW is to retain full responsibility for the safety of the ship. The trainee may be briefed on the situation but he shall not take control ('The con').

It shall be best practice to avoid hand over of watchkeeping responsibilities during any critical phase of the voyage, or mid-way through any verification process.

To ensure continuity of effective lookout at night hand over of OOW and lookout responsibilities at the same time should be avoided. If unavoidable the off-going OOW is to ensure that sufficient time is allowed for the on-coming lookout's eyesight to adjust for night vision.

### 2.4 Taking over the Watch

The relieving Officer should not take over the watch until: -

- His vision has adjusted to the light conditions and gained night vision.
- Any manoeuvre, critical operation, or other action to avoid an immediate hazard has been completed.
- He has satisfied himself on the following points:-

- position of the ship and has plotted the position on the navigation chart;
- distance and time to next waypoint at present speed;
- ship's speed, gyro and magnetic courses, applicable errors and corrections for prevailing tide and weather;
- other vessels in the vicinity, their apparent movements and possible action required by own ship;
- current visibility, weather and forecast;
- status of navigational equipment, propulsion and auxiliary machinery and any defects;
- ship's draught and the current depth of water;
- status of navigation and signal lights, shapes and flags;
- applicable navigation warnings, any current emergency radio traffic and radio channels being guarded;
- status of indicators for watertight and weathertight doors;
- status of stabilisers;
- status of fire detection system, GMDSS equipment, Voyage Data Recorder and CCTV systems;
- any special vehicle deck considerations such as dangerous goods, livestock;
- Master's night orders when appropriate;
- that all members of the navigational watch are fully capable of performing their duties;
- any hazards likely to be encountered;
- any special shipboard operations currently in progress or anticipated.

## **2.5 Control of Navigation ("the con")**

The Master or OOW is deemed to have the con when that person is directing control of the navigation of the vessel.

Handovers of the con must always be conducted in a formal manner. Handover must conclude with a positive statement of acceptance ("I have the con") so as to ensure that all members of the Bridge team know who is in charge of the navigation of the vessel.

The handover must include all information relevant to the navigation of the vessel as appropriate to the current situation.

When the Master is on the bridge, the OOW will retain the con until such time as the Master decides to take over and the correct procedure is completed for handover.

When the Master has assumed the con, the OOW will continue to monitor the navigation and safety of the vessel unless the Master clearly indicates that he is taking sole charge of the watch and assuming all duties of the OOW in clear waters. On taking the con from the OOW the master should brief the OOW on his requirements for continued monitoring of track and safe navigation.

## **2.6 Vigilance of OOW and person with control of navigation ("the con")**

No distractions are to be permitted to interfere with the vigilance of those responsible for the safe conduct of the ship. Full situational awareness shall be maintained at all times by the OOW, the lookout and the person with control of navigation. It is forbidden for any commercial broadcast to be received on the bridge. Internal telephone calls shall not be allowed to cause distraction and no mobile telephone calls shall be made from or received on the bridge. The only exception to this mobile telephone prohibition will be use in management of an emergency situation by the Master in which case the OOW is not to be distracted from navigational duties.

## 2.7 Watchkeeping During Hours of Darkness

### 2.7.1 Small Craft

Officers must be aware of the likelihood of encountering yachts or other small craft, especially during the period April to October, which may be poorly lit (or unlit) and which may not be readily detectable by radar due to poor radar signature and ineffective radar reflectors.

### 2.7.2 Drilling Rigs and Semi-submersibles

These structures must always be given a wide berth. It must be remembered that they may have unlit buoy patterns on the water's surface within a radius of two miles

### 2.7.3 Lighting

Lighting levels on the bridge and equipment should be adjusted to the lowest level practicable to minimise loss of night vision. Curtains are to be used at night so as to protect the officer of the watch and lookout from any potential loss of night vision. Any deck or accommodation lighting that is interfering with visibility forward or aft is to be turned off or adequately shielded.

Adequate lighting is to be maintained around outside passenger decks and access ways which are in use whilst at sea. Care must be taken to ensure that such lighting does not interfere with the keeping of a proper lookout or the visibility of the vessel's navigation lights.

### 2.7.4 Bridge Blackout Procedures

To ensure safe navigation it is critical that night vision is not impaired by ambient light level or deterioration in watch keepers night vision. It has been determined that it may take up to 30 minutes for night vision to fully recover from exposure to bright light and that at least 10 minutes should be allowed for an individual's eyesight to adjust for night vision.

The Master is to ensure that sufficient blackout facilities are provided by curtains and shaded lighting.

The OOW is to ensure that;

- all chart table (and other) blackout curtains are closed during hours of darkness,
- all chart table lights are dimmed to minimum practicable level of lighting and that any shading or colour filter remains in place,
- lookout duties are not handed over to another individual without 10 minutes being allowed for the eyes of the person assuming lookout duties to adjust to night vision,

## 3 Lookout and Steering

### 3.1 Lookout

The look-out must be able to give full attention to the keeping of a proper look-out and no other duties shall be undertaken or assigned which could interfere with that task.

All those carrying out the role- of lookout are to be briefed on their duties to assist the OOW to determine if risk of collision or close passing exists by reporting craft detected by sight or hearing and detecting ships in distress, shipwrecked persons, wrecks, debris and other hazards to safe navigation.

The lookout should also be briefed that he should call the Master if he has serious doubt about the safety of the ship or another craft, but is unable to persuade the OOW of the need to do so.

Where lookout and helmsman exchange roles during a shift it must be clearly understood who is acting in each capacity. Bridge team ratings are to be recorded in the Deck Log and when practicable lookout duty is to be noted.

A rating is not to take over as look-out until his eyes have adjusted for night vision. Exposure to light is to be avoided so far as is practicable by the look-out during the hours of darkness so as to maintain good night vision.

An efficient lookout is to be kept by sight and hearing to detect other craft, ships in distress, shipwrecked persons, wrecks, debris and other hazards to safe navigation. Lookouts should vary their position on the bridge to ensure coverage all round the horizon. This implies intelligent anticipation of possible danger and the taking of sufficient action in good time to prevent a dangerous situation developing. In good visibility radar echoes should be correlated with the visual picture.

The Master and OOW are to maintain good situational awareness at all times. The lookout is to be included within the bridge team to assist in all round awareness. The OOW should exchange information on weak radar contacts and seek positive identification of the object so far as practicable.

In addition to the OOW, a lookout is to be posted. The lookout must hold a Navigation Watch Rating Certificate and his name is to be entered in the Deck Log. He is to remain on duty until relieved and report all sightings. His duties should not be interrupted.

Masters, Officers and lookouts must be aware of the likelihood of encountering yachts or other small craft which may be poorly lit or unlit.

### 3.1.1 Wearing of Glasses by the Lookout

MAIB investigation has determined that persons who wear photochromic (reaction) glasses may suffer a loss of up to 20% night vision. Although there is not yet any industry requirement in this respect it should be noted that the wearing of clear glasses will avoid any potential detriment to night vision.

### 3.1.2 Lookout on HSC

On HSC a minimum of two officers must always be on duty on the bridge (the operating compartment), while the craft is under way, one of whom may be the Master. The normal bridge manning on HSC will be Master, Navigator, and Senior Engineer. Each of these officers should include visual lookout alongside their other duties. The Master shall supplement this bridge team with other personnel for lookout duties, in restricted visibility, during the hours of darkness, or in any other circumstance such as technical problems which may distract the normal bridge team from keeping a proper lookout.

In addition to the duties detailed in section titled 'Lookout', lookouts on HSC must especially bear in mind the danger to the craft from floating debris striking the aluminium hull at speed.

## 3.2 Helmsman

When at the helm the helmsman should undertake no other duties which may adversely affect his primary function of steering the ship. In particular he is not to be designated lookout although it is reasonable that he should report any sightings.

When on watch but not actually at the helm, the helmsman may be employed on other duties but must be immediately available to take the helm at any time without advance warning.

Except when undergoing training under competent supervision, the helmsman must be the holder of a Navigational Watch Rating Certificate and his name must be entered in the Deck Log. A change of helmsman is to be previously approved by the OOW/Master with the con.

A newly appointed helmsman must not be allowed to take the helm for the first time until he has been made fully conversant with the type of equipment fitted and its operation. He must have demonstrated an adequate level of competence under close supervision while the ship is in clear waters.

## 3.3 Changing over of Steering Methods/Positions

The OOW shall ensure that the navigational situation has been assessed before the autopilot is engaged. When the autopilot is used for extended periods, hand steering shall be tested once every watch;

Any change between automatic and manual steering modes is to be supervised by the OOW. Whenever there is a change over either between steering methods (autopilot to hand), or between

steering positions (e.g. from the centre console to the bridge wing control), it is imperative that confirmation of the 'take over' is verified by making a small alteration of course.

### 3.4 Hand Steering

Hand steering should be used in conditions of restricted visibility, for traffic situations, buoyed channels, large course alterations, entering and leaving port, and in any situation where the automatic pilot may have difficulty maintaining course, e.g.. in heavy weather (especially with a following or quarterly sea), or with one main engine out of action.

Masters are to ensure that instructions are issued to the OOW to specify the minimum passing distance at which another vessel may be passed whilst in automatic pilot. Sufficient safety margin should always be allowed to control the risk of a human error or technical failure on either ship. In any event manual steering should be engaged when within 0.5 miles of another craft.

### 3.5 Helm and Course Orders

Helm orders are to be given in the sense of the rudder movement to be applied and not the amount of course alteration required; it should be clear that these are orders so should not be followed by the word 'please'. Helm orders should be clearly audible by all members of the bridge team.

Helm orders for course alteration should be given as either: -

- "Starboard/Port, Steer xyz (new course); or
- "Starboard/Port X (degrees of rudder)", "Midships", "Steady" and/or "Steer xyz"

The helmsman must clearly repeat all orders and report when carried out.

Regardless of whether or not he has "the con", the OOW must always verify that helm and course orders have been correctly understood and carried out.

On entering or leaving port the helmsman may be directed to steer by a specific sea or landmark, care being taken that there is no doubt as to which mark is involved.

The helmsman must clearly repeat all helm orders.

#### 3.5.1 Effect of Helm

Officers should be aware that the use of large angles of helm when the vessel is on full power at sea may cause an excessive angle of heel and overloading of the main engines. It is good practice to plan ahead for alterations of course so as to minimise the use of helm or to reduce propeller pitch before commencing an alteration. Nevertheless, course alterations necessary to avoid immediate risk of collision are to be made whether or not pitch has first been reduced.

Officers on HSC must be constantly wary of the possible effect on the gyro of sudden alterations of speed or course.

## 4 Action to Prevent Collision

Officers are required to be thoroughly familiar with the content of all Prevention of Collision Regulations and in addition to Section I must strictly comply with Sections II and III of the Steering and Sailing Rules whilst taking account of their fundamental differences.

It is good practice to take sufficiently early action to avoid collision in accordance with Section I ahead of the point at which either Section II or III come into effect. Such action should be sufficiently positive to be easily detected by other vessels both visually and by radar. Such alterations should endeavour to ensure that the CPA is not less than 1.5 miles ahead of the other vessel and 0.5 mile abeam/astern of the other vessel unless physical constraints require consideration of a smaller distance so that navigational safety and good seamanship is maintained. A greater CPA is to be achieved in all situations in which it is good seamanship to do so.

Close quarters situations are to be avoided by good seamanship and the timely application of all Steering and Sailing Rules, particularly Rules 16, 17, 18 and 19.

Officers shall never assume that another vessel (including a fast vessel) will keep clear, particularly if the other is the give way vessel according to strict compliance with the rules.

Speed should be reduced if necessary, giving prior warning to the ECR if time allows. In heavy weather due account must be taken of the possible effect of any alteration of course or speed on the vessel's motion and the Master informed if any problems are likely to arise.

Officers on HSC must always bear in mind their extra fast closing speed especially if encountering another HSC in an end-on situation.

Good situational awareness is to include appreciation of the navigational situation as viewed from the other vessel.

Action taken to avoid collision or close quarters shall be monitored to ensure effectiveness.

When own vessel is required to stand-on action to prevent collision shall be taken when the give-way vessel is at a distance of 2 miles if no action by the give-way vessel to prevent collision or close passing is apparent.

Positive action is to be taken to ensure the safety of others immediately following any near miss situation or potential swamping of a small craft.

The OOW should engage hand steering with a rating on the wheel in advance of a close quarter situation developing to allow himself the broadest possible range of options for taking avoiding action.

Where immediate manoeuvring is required the OOW should engage hand steering with a rating on the wheel at the earliest opportunity so that he is free to move about the bridge and maintain full awareness of the situation.

## 5 Safe Speed

In making a proper assessment of safe speed all factors listed in Rule 6 are to be considered and in addition the following should also be taken into account during the assessment process:

- The number of radars being actively monitored and systematically scanned.
- Use of varying ranges for long range detection and close scrutiny of shorter ranges.
- Efficiency and performance of the radar sets in use including the different radar wavelengths available.
- Continuous assessment of the characteristics, efficiency and limitations of the radar equipment through close scrutiny in all conditions.
- Degree of confidence in performance and detection of small targets and floating objects through detailed observation of radar targets and visual targets in good visibility.
- Bridge resource management including composition and experience of the bridge team with regard to prevailing circumstances and conditions and thorough briefing of all.
- The readiness for immediate manoeuvre through reducing speed, altering course or engaging astern power.
- Performance of AIS.
- Proximity to structures likely to cause interference to radar performance and ARPA tracking such as wind farms.

### 5.1 Use of Engines and Whistle

The OOW should bear in mind that main engine controls and whistle are at his disposal and he should not hesitate to use them whenever necessary. Officers are to fully understand any operational limitations and are to be confident about use of engines. It must be remembered that in close quarters situations when vessels are in sight of each other, the use of sound signals is mandatory and light signals are only supplementary (Colregs rule 34.)

## 6 Use of Auto-pilot

The autopilot should always be used with caution, after a proper assessment of the situation and its safe use depends on officers being completely familiar with the equipment, its capabilities and limitations. Whenever the autopilot is used, it must be possible to establish manual control within 30 seconds, and a qualified helmsman shall be ready at all times to take over the manual steering.

Manual Steering is to be engaged in good time before any potential close quarters situation.

Masters are to ensure that instructions are issued to the OOW to specify the minimum passing distance at which another vessel may be passed whilst in automatic pilot. Sufficient safety margin should always be allowed to control the risk of a human error or technical failure on either ship. In any event manual steering should be engaged when within 0.5 miles of another craft.

## 7 Passing Navigation Marks, Anchored Vessels and Breakwaters

All OOWs are expected to be familiar with the characteristics of local sea and land marks, and to be able to identify them readily on the radar screen.

Due allowance must be made for the effects of wind and tide when passing close to navigation marks, anchored vessels, breakwaters and other fixed obstructions, particularly during spring tides, strong winds or when the vessel is proceeding at reduced speed.

Critical phases of any pilotage are to be proactively monitored to ensure that intended clearances are achieved. Parallel index or relative motion target trails are to be used for this purpose. The voyage plan should enable monitoring of beam clearances throughout the approach to and transit of critical phases of pilotage.

Masters and Deck Officers should be aware of the possible effects of interaction between the ship and other vessels, the seabed or harbour structures and on the ship's manoeuvring characteristics in shallow water. In addition they should also be aware of the measures necessary to avoid excessive squat when the vessel is in shallow water.

## 8 Passing Wind Farms

Significant degradation of radar and ARPA performance has been found to result from close proximity to a wind farm. Targets are unlikely to be detected or tracked until well clear of a wind farm. For this reason Masters are to ensure that an appropriate safety margin is maintained. Voyage planning should maintain a distance of at least 2 miles from any wind farm.

## 9 Ship's Position

The position of the ship is to be fixed at intervals appropriate to the navigational situation, an increased frequency being required in confined waters. The position must be manually plotted on the navigational chart or frequently observed on an electronic chart display, if approved as the principal means of navigation, so that the OOW may effectively monitor the track to be followed and ensure safe clearance of any danger to navigation. Whenever possible, the accuracy of positions obtained from one electronic system must be checked by comparison with another system and by visual means. Implicit reliance should not be placed on floating navigation marks always being in their correct positions.

In vessels with a fully functional Approved Electronic Chart Display and Information System (ECDIS) ENC may be used as the primary means of navigation if the Master ensures that:

- A paper chart of suitable scale is displayed for immediate reference.
- The complete folio of operational paper charts is immediately available and fully corrected. (Operational folio may be reduced on vessels if MCA/NIS agreement is obtained following the company's ECDIS submission and risk assessment.)
- Plotting implements (pencil, dividers, parallel rule) are immediately available for position plotting.

- ENC are fully corrected.

Although not a requirement it is considered best practice for ships with approved ECDIS to plot the ship's position on the chart occasionally for cross-check purposes.

The master and OOW are not to place too much reliance on Electronic Navigation Aids and are to ensure that visual or, when not available, other means of cross-referencing are fully utilised.

In the event that there is a navigation input failure in restricted waters the person with the con is to maintain situational awareness whilst recognising that the ECDIS, radar or route map and radar with GPS speed input cannot be relied upon. This is one reason why a radar should always be on log speed. The adjustment of settings to re-establish correct input should be undertaken by a person who does not have the con. If necessary another officer should be called to the bridge to assist this process.

In restricted channels or during port departures and entries the OOW must continue to monitor the position in order to advise the Master of track offset if a deviation from the planned track occurs or if there is any element of uncertainty or departure from the briefed voyage plan. Monitoring should be carried out by such means as may be appropriate including position fixing, parallel index, visual transit observation, use of electronic navigation charts and radar mapping so as to cross-check any errors arising from any single method. At all times the most suitable chart of the largest available scale should be in use.

The echo sounder should be proactively used to compare depth shown on chart against depth beneath ship. The depth alarm should be set at a suitable depth to alert the Master/OOW to any unexpected reduction in under keel clearance.

## 9.1 Ship's Track

The courses marked on the chart are to be followed, subject to alterations for traffic purposes, to ease motion in heavy weather, or to the Master's special instructions.

In the event that circumstances such as traffic density dictate a substantial deviation from the marked track, the OOW must carefully assess the navigational implications of such deviation and ensure that the proposed new track is safe and proper in every respect and is marked on the chart.

If for any reason the Master deems it necessary to set a course contrary to the requirements of COLREGS Rule 10, the relevant coastal authorities should be notified, if appropriate. (Acknowledgement by the relevant TSS authority of such an action does not imply approval or permission). Entries should be made in the OLB and Deck Log Book detailing and explaining the actions taken. The proper course is to be resumed as soon as it is safe to do so.

## 10 Use of VHF

The use of VHF communication with other vessels for the purpose of collision avoidance may be useful in certain situations but officers are to be aware of the dangers of so doing. Use of VHF for this purpose is to be avoided, particularly at night, in poor visibility, in a crowded seaway and whenever it is not possible to positively identify the other vessel.

Should such manoeuvres be arranged via VHF caution must be taken to confirm the identity and precise location of the other ship and that the other ship acts in accordance with the arrangement. It must always be remembered that other shipping in the vicinity may not be aware of any "private" arrangement.

Under no circumstances should there be any delay in taking action necessary to avoid collision whilst attempting to establish VHF contact.

## 11 Investigation of Alarms

The OOW shall ensure that all alarms are fully investigated. Manual fire alarms are to be treated as priority. In circumstances in which a false alarm is suspected, for example vehicle deck fumes, the alarm is to be checked by visual inspection without delay; otherwise the alarm is to be assumed to indicate fire.

Additional manpower should be called to the bridge at any time that an alarm causes prolonged distraction to the OOW or lookout from their navigational and lookout duties.

## 12 VDR capture of navigational history

The OOW should ensure, so far as is practicable, that the VDR recorded radar reflects the current navigation of the ship. In pilotage waters this may be achieved through the use of the VDR-linked radar by the person conning the ship, or alternatively by the supporting officer (OOW) ensuring that the VDR-linked radar is tuned and set to a suitable range for recording the navigation taking place at that time.

## 13 USE OF RADAR

### 13.1 Radar as an Aid to Navigation

RADAR IS A VALUABLE AID TO SAFE NAVIGATION AND SITUATIONAL AWARENESS BUT IT IS ESSENTIAL THAT MASTERS AND OFFICERS RETAIN A CLEAR UNDERSTANDING OF ITS LIMITATIONS.

MARGINS OF SAFETY ARE NEVER TO BE REDUCED ON THE BASIS OF RELIANCE ON THE ACCURACY OF INFORMATION FROM RADAR.

USE OF RADAR MUST NOT DETRACT FROM THE EFFECTIVENESS OF VISUAL LOOKOUT.

RADAR RETURNS FROM A SMALL CRAFT MAY BE SO WEAK THAT THE TARGET IS NOT READILY DETECTABLE ON RADAR.

In particular the following precautions should be applied: -

- radar sets should be regularly checked to confirm that they are performing satisfactorily with regard to azimuth and range accuracy and correct alignment of the heading marker;
- plotting errors resulting from incorrect speed or heading inputs for own vessel can produce significant errors in calculating the course and speed of a target and in predicting its CPA and TCPA. The accuracy of these inputs should be checked at frequent intervals;
- Masters and Officers are to be mindful of the possible hazard of using a ground based display when assessing the collision risk of an approaching target, taking particular note of the potential for error in determination of the target's aspect. The possibility of the misinterpretation of 'ground based display information' should be guarded against by having one ARPA on NAV and one on LOG speed;
- Masters and Officers should remember that predictions derived from all Radar plots, including ARPA and True Motion, are based entirely on the assumption that the target will maintain course and speed and that small alterations of course or speed by the target may not be immediately apparent.
- Masters and officers are to ensure that clutter controls are periodically switched between auto and manual control on both the operational range and a lower range during hours of darkness and in reduced visibility so as to assist the detection of small poorly lit craft. It should be noted that small craft may only be detectable on radar by optimal adjustment of the manual clutter control from time to time.
- The display linked to the VDR should always be operational and on an appropriate range whilst at sea or at anchor. Any other display should, if not in use, be in 'stand-by' mode. At

least two displays are to be monitored at sea, but best practice will involve proactive use of all.

- AIS vector information displayed on the ARPA has many benefits relating to situational awareness and immediate indication of another vessel's alteration of course. AIS vectors derive from course and speed information transmitted from the target ship. Use of this display mode is encouraged if the interface is available. However ARPA displayed AIS information must not be permitted to interfere with the maintenance of an efficient radar watch.
- Anti-collision decisions are to be based upon visual, radar or ARPA information. Target vectors displayed on ENC are to be used for situational awareness only and should not be relied upon for anti-collision.
- Officers are to be aware that significant degradation of radar and ARPA performance has been found to be experienced when close to a wind farm.

### **13.2 Use of Radar – on Departure**

All radar sets are to be set up and tested in accordance with procedures and left on range scales and display modes as directed by the Master. Where the facility exists, the docking radar should be turned so as to be visible from the conning position.

The main ARPA is designated as the primary anti-collision radar and should be fully set up with all relevant displayed targets acquired and the Master and OOW should acquaint themselves with the situation in and outside the harbour before leaving the berth.

The OOW is to monitor the radar during departure in order to monitor the safe execution of the voyage plan and the traffic situation to seaward. He is to acquire targets as soon as possible in support of early assessment.

Parallel index lines, clearing bearing lines or clearing range rings are to be set and positively verified as a matter of course.

### **13.3 Use of Radar – on Passage**

In determining risk of collision ARPA shall not be relied upon to the exclusion of all other measures. Data derived from ARPA on closest approach of another vessel is to be verified by another means.

The main ARPA shall be used as the principal radar and all appropriate targets shall be acquired and assessed. The radar shall be set to a range scale appropriate to the navigational situation. Where fitted "trails on" is to be selected.

If the ARPA is being used on a low range scale, higher ranges shall be monitored regularly to enable early detection and acquisition of targets, particularly those of high speed craft.

A second display shall be monitored and, so far as practicable it shall be set to operate on a different frequency so as to optimise target detection.

The second ARPA should be set to different speed input, reference and vector type so as to compliment other data and present a comprehensive display of all available information rather than mere duplication. This good practice will also reduce the possibility of reproducing errors in the ARPA.

The docking radar is to be in operation on a lower scale than the main ARPA, with the forward scanner selected and "tracks on". Whenever possible the radar should be turned so that it is visible from the conning position.

### **13.4 Use of Radar - on Arrival**

The OOW is to continue to monitor the ARPA and docking radar during the approach in order to monitor the safe execution of the voyage plan.

Parallel index lines, clearing bearing lines or clearing range rings are to be set and positively verified as a matter of course

### **13.5 Use of Radar for Clear Weather Practice**

Clear weather practice for collision avoidance and port entry and departure is of particular value in a ferry trade. Masters shall ensure that they and all Deck Officers gain this practice as often as practicable. Parallel index techniques are to be routinely used for track keeping in all weather conditions.

For Restricted Visibility Radar practices refer to paragraph 14.1 (Blind Pilotage)

## **14 RESTRICTED VISIBILITY**

### **14.1 OOW Action**

The OOW is to call the Master whenever restricted visibility (2 miles or less unless the Master stipulates a greater distance) is encountered or believed to be imminent and take whatever immediate action may be necessary to ensure the safety of the ship. He shall also ensure that a helmsman is immediately available and revert to diesel alternators if safe and appropriate to do so.

On his arrival on the bridge and following adequate appraisal of the situation, the Master shall, if he considers it necessary, take over "the con". He may, at his discretion, allow the OOW to retain "the con" but must continuously monitor the situation and be prepared to take over at any time. The ECR should be notified, engine room telegraphs placed on "Stand by" and the OOW should confirm that all watertight doors are closed. The echo sounder should be on with the alarm set to an appropriate depth for monitoring safe passage.

On HSC the normal bridge team must be supplemented by additional personnel to ensure that there are adequate resources to allow safe navigation to continue.

Additional care should be taken to ensure that all relevant events and actions are logged during Stand-By periods for reduced visibility.

### **14.2 Bridge Manning**

When the vessel is in or near conditions of restricted visibility, there is always to be a lookout and a helmsman on the bridge in addition to the Master and OOW.

Autopilot steering may be continued at the Master's discretion provided that the helmsman is immediately available and the vessel is clear of shipping or navigational hazard.

### **14.3 Signals**

Navigation lights shall be exhibited and the whistle sounded in accordance with the International Regulations for Preventing Collision at Sea.

The whistle signal may be switched to automatic control when appropriate but should be switched to manual if there is any likelihood of a need to manoeuvre or when the vessel is entering or leaving port and to assist communications between the bridge team.

### **14.4 Speed in Restricted Visibility**

Safe navigation is of paramount importance. Masters and Officers shall adhere to the basic principles of good seamanship. In determining safe speed, Masters shall take into account all the factors detailed in the International Regulations for Preventing Collision at Sea and relevant Marine Guidance Notes. Sensible use of radar and other aids to navigation greatly assist the conduct of ships in reduced visibility. These aids have not reduced the need to comply fully with the regulations by proceeding at a safe speed, paying special attention to good watch keeping, navigating with caution and at all times exercising proper seamanship. Reduction of speed shall be recorded in the bridge log.

In making a proper assessment of safe speed all factors listed in Rule 6 are to be considered and in addition the following should also be taken into account during the assessment process:

- The number of radars being actively monitored and systematically scanned.

- Use of varying ranges for long range detection and close scrutiny of shorter ranges.
- Efficiency and performance of the radar sets in use including the different radar wavelengths available.
- Continuous assessment of the characteristics, efficiency and limitations of the radar equipment through close scrutiny in all conditions.
- Degree of confidence in performance and detection of small targets and floating objects through detailed observation of radar targets and visual targets in good visibility.
- Bridge resource management including composition and experience of the bridge team with regard to prevailing circumstances and conditions and thorough briefing of all.
- The readiness for immediate manoeuvre through reducing speed, altering course or engaging astern power.
- The provision of an effective look-out by sight and hearing
- Performance of AIS.
- Proximity to structures likely to cause interference to radar performance and ARPA tracking such as wind farms.

### 14.5 Radar Plotting

A continuous radar watch shall be maintained on all available radars and shall include the systematic plotting of acquired targets. Plotting shall normally be carried out on ARPA displays, but at least one display which may be a docking radar if visible from the conning position, should be used to monitor the short range relative motion plot.

When true vectors are displayed it is good practice to regularly change from true to relative vector display to further assess if risk of collision exists. Similarly it is good practice to switch the heading marker off from time to time to ensure it does not obscure any target.

The Master and OOW should normally monitor different ranges and display modes so as to reduce the likelihood of undetected targets or plotting errors.

The controls on each radar set should be carefully adjusted so as to produce the optimum performance, paying particular attention to the detection of small targets within clutter areas.

Radar stabilisation mode must be understood when considering target aspect. Ground referenced vectors will not indicate true aspect in conditions when beam tidal set exists.

It is important that Masters and OOW clearly understand this factor in reduced visibility.

## 15 Lookout, Visual and Aural

In reduced visibility a good lookout is to be maintained both visual and aural. The lookout is to report all sighting of lights and hearing of fog signals or other sound to indicate the presence of another craft. The officer of the watch is to ensure that a window is opened to assist the audibility of external sounds within an enclosed bridge.

## 16 Use of Radar in Port Transit

If an anti-collision radar is used for the final approach and entry, it should be remembered that the height of the scanner may cause inaccuracies at very short ranges. The ends of the piers may not be accurately detected as the vertical beam width may pass above targets close to the vessel. In this situation the vessel will appear further off the piers or other objects than is actually the case. The docking radar should always be checked during the final approach.

In addition to observing the general guidance contained in this document, the Master must pay particular attention to briefing the Bridge team as to his intentions and radar requirements in good time before the commencement of departure and arrival manoeuvres in restricted visibility. Briefing is to include deployment of radar resources to ensure that the ships track is monitored by parallel index and relative motion target trials.

In planning arrivals and departures, due account must be taken of all relevant prevailing conditions and, while maintaining the Master's sole authority for decision, alternatives to such clear weather manoeuvres as "running turns", should be fully considered in restricted visibility. The voyage Plan should enable monitoring of beam clearances throughout the approach to and transit of critical phases of pilotage.

### **16.1 Blind Pilotage**

Blind pilotage information for relevant ports shall be maintained and incorporated with parallel indexing practice in clear weather to ensure competence and familiarity with radar picture of the port and berth approaches. It is important to remember that turning and stopping distances experienced during practices in clear weather will be different to those found at lower speeds in fog. When the Master chooses not to carry out the blind pilotage himself, he shall designate one officer to be responsible for only the blind pilotage. This shall be included in his pre-arrival briefing. The designated officer will advise the Master on the position of the ship, speed, projected track, clearing distances and other vessel movements.

Restricted visibility blind pilotage practice is to be regularly undertaken to maintain a high degree of competency by Master and OOW. This is to be recorded in the bridge log.

Experience has shown that, in significantly reduced visibility, objects close to the ship when eventually sighted visually frequently appear to be much closer than was imagined to be the case from radar observation of the situation.

When making a short approach to a port in restricted visibility, consideration should be given to allowing the officer already established on the radar watch to remain on these duties, in order that his experience and the continuity of reporting can be maintained.

The use of radar mapping facilities will greatly assist the confidence of the user in blind pilotage techniques. Care should be taken to ensure the detail is accurate and the method of stabilising is appropriate.

## **17 Automatic Identification System (AIS)**

AIS can provide information to enhance situational awareness particularly if interface with ARPA radar is available. AIS vectors will indicate alteration of course by another vessel in real time as the AIS vector is based upon other vessel's AIS VHF transmitted data. Integrity of AIS information received is dependant upon the accuracy of the target ship's input data. For this reason AIS course and speed information should not be used to inform a collision avoidance decision without extreme caution and should only be used to supplement the decision which shall be based upon available visual and radar information.

AIS vectors are ground referenced but will be automatically converted to water reference when the ARPA is used in that mode.

## **18 SUMMARY / MEMORY AID: RESTRICTED VISIBILITY**

### **18.1 REDUCED VISIBILITY DEPARTURE**

TAKE OUT BLIND PILOTAGE CHART FOR PORT AND MANOEUVRE

ACQUAINT BRIDGE TEAM WITH PLAN AND INTENDED MANOEUVRE

INSTRUCT OFFICERS AS TO THEIR ROLE DURING DEPARTURE

### **18.2 5 Minutes Prior to Departure**

HAVE OFFICER OR QM MONITORING VHF

ACQUIRE AVAILABLE TARGETS ON TWO ARPA RADARS

SELECT APPROPRIATE RANGES FOR ALL RADARS (One to be monitoring outside traffic situation)

SET UP PARALLEL INDEX FOR MONITORING VOYAGE PLAN

### **18.3 Upon completion of checks and vessel ready for departure**

CHECK THAT BRIDGE TEAM ARE IN POSITION AND READY

LEAVE BERTH SLOWLY FOLLOWING INTENDED TRACK

### **18.4 REDUCED VISIBILITY ARRIVAL**

APPROPRIATE BLIND PILOTAGE CHART IN USE

ALL APPROPRIATE PERSONNEL SHOULD BE ON BRIDGE

BRIEF TEAM AS REQUIRED – Brief Forward Supervisor of Light & Sound Signals

OFFICERS TAKE UP RESPECTIVE POSITIONS

MASTERS SHOULD HAVE "THE CON"

ARPA RADARS ON NAVIGATION & COLLISION ASSESSMENT MODE

(Master to consider whether to require at least one on log speed to guard against GPS error)

SET UP PARALLEL INDEX LINES FOR MONITORING VOYAGE PLAN

SET UP AT LEAST ONE RADAR TO MONITOR RELATIVE MOTION TRAILS

SET UP DOCKING RADAR AS REQUIRED

ASSESSMENT OF TRAFFIC SITUATION & BERTHING INSTRUCTIONS

VESSELS SPEED DEPENDENT UPON PREVAILING SITUATION, WAIT FOR CLEAR APPROACH TO ENSURE STEADY APPROACH TRACK FOR MONITORING BEAM CLEARANCE

### **18.5 Closing the Port (1.5 to 2 miles)**

BOSUN IN POSITION FORWARD, ANCHORS CLEARED AWAY (good lookout being kept)

ENTRY RADAR TO SHORT PULSE, ENHANCE MODE OFF, AUTO CLUTTER OFF, RELATIVE MOTION, TRAILS ON

AUTOMATIC WHISTLE OFF. MASTER TO INSTRUCT ON SOUNDING OF WHISTLE

CHECK HEIGHT OF TIDE, SET AND TIDAL STREAM. ENSURE THAT VESSEL IS BROUGHT ONTO APPROACH COURSE AS EARLY AS POSSIBLE SO THAT SET & DRIFT IS ASSESSED AND BEAM CLEARANCE VERIFIED

CONTINUE TO CLOSE PORT IF WAY IS CLEAR. ENSURE THAT INTENDED LINE IS CLEAR OF OTHER VESSELS

### **18.6 From One Mile Off**

OOW REPORTS 'DISTANCE OFF' AT PREDETERMINED INTERVALS, CHECKS THAT TRACK MADE GOOD, IS AS PLANNED AND GIVES PROJECTED CLEARING DISTANCES

OTHER OFFICER REPORTS SPEED, CHECKS ACTIONS OF QM, SOUNDS FOG SIGNAL MANUALLY, KEEPS LOOKOUT

DOCKING RADAR MONITORED AT CLOSE RANGE

### **18.7 Inside Harbour**

OFFICERS CONTINUE TO MONITOR SPEED AND DISTANCE OFF & REPORT

IF DENSE FOG, KEEP PASSENGERS IN LOUNGES UNTIL SAFE DOCKING IS ASSURED

(NOTE: RADAR PROCEDURES TO BE FOLLOWED REGARDLESS OF AVAILABILITY OF ELECTRONIC NAVIGATION CHART)

Uncontrolled Document

NAVIECDIS - User Manual

**NAVIECDIS**  
Setting The Standard



Electronic Chart Display and Information System

**Electronic Systems**  
**Sperry Marine**

# NAVIECDIS Integration for Safe and Efficient Navigation



## Type Approved ECDIS

The type approved IMO compliant NAVIECDIS is a clear choice for professional navigation and maneuvering. The unique uncluttered display format with intuitive user controls offers the watch officer a complete navigation solution allowing for immediate response to virtually any situation.

### Highlights

- Universal Chart Manager that reads both raster and vector electronic chart formats
- Windows based “Pop Up” information displays that are also movable provide a convenient way to present important information
- The system offers complete routing and monitoring facilities including an anti-grounding alarm
- Navlines maps, with interface to radar, aid in the identification of useful navigation lines such as channel boundaries, hazardous areas, and intended track lines

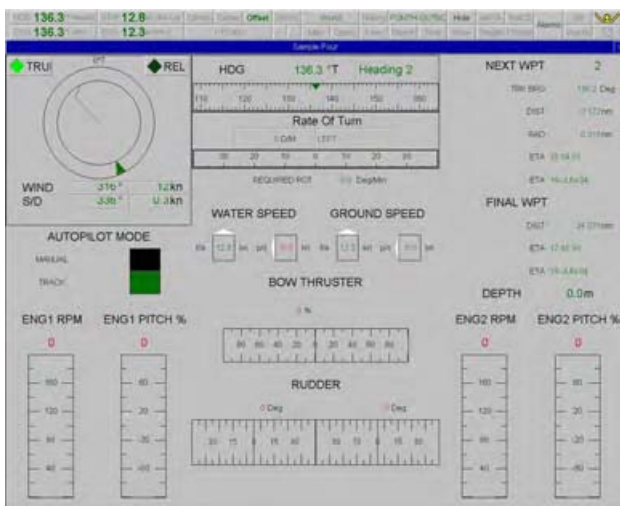


## Vessel Advance Prediction & Target Correlation

The highly desirable advance prediction feature offers a graphical estimate of the vessel's advance at operator selected time intervals. The automatic target correlation capability allows APRA target inputs from multiple radars and provides common identity numbers on both NAVIECDIS and radar displays

### Highlights

- Multi sensor approach to advance prediction
- Scaleable ownship outline
- Unique target correlation improves situation awareness and safety margins

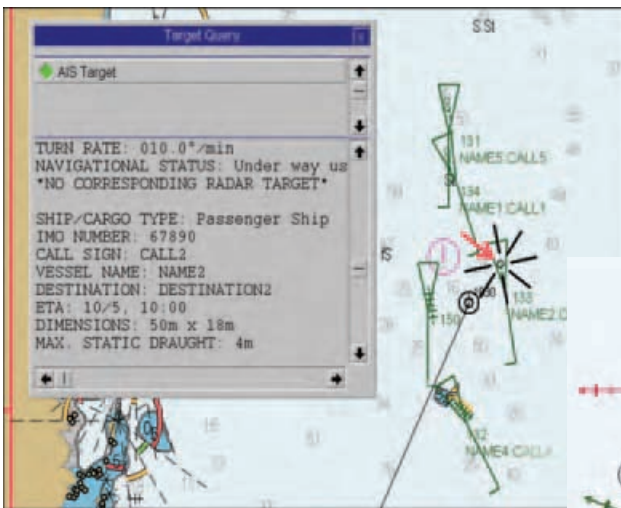


## Conning Information Display (CID)

The CID provides access to one or more windows designed to give the watch officer quick access to important data. Each CID page provides data in an easy to read format that includes navigation information, engineering status and alarms of other areas of interest.

### Highlights

- Configurable screens
- Flexible interface to navigation and other systems
- Stand-alone and integrated navigation configurations



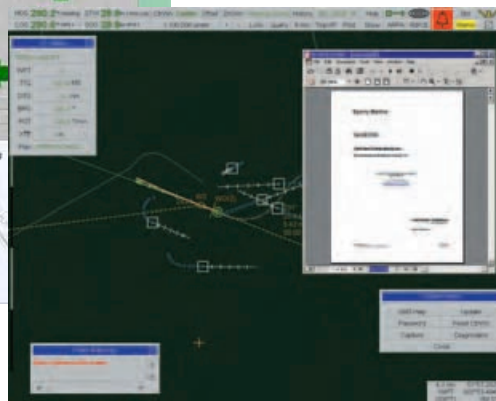
## Overlay Radar ARPA & AIS Targets

A modular interface enables the display of both radar ARPA and AIS targets on the chart in a clear and concise format. A comprehensive menu allows the operator to select the desired display format on the chart. Tabular listing of targets and CPA / TCPA alarms are also included. A simple operator command provides fast access to a “Pop Up” target data window that displays complete AIS information.



## Docking Display & Online Manual

The Docking Display uses inputs from various sensors to compute the ship's fore and aft motion and its port and starboard velocity at the bow and stern. This innovative display window is very useful during ship docking and other low speed maneuvering operations such as anchoring. In addition to help based “tool tips,” at the click of a button, the operator's manual is available for added guidance.



## Radar Overlay

This optional capability uses an advanced hardware interface to a radar to allow radar video to be presented on the electronic charts. With this option, the alignment of charted objects with the radar position of the same objects can provide a visual check of the chart and ownship position as reported by the position sensors. The operator can select a radar transceiver for the radar video display and adjust the radar video. It can serve as a back up radar display to the main radar.



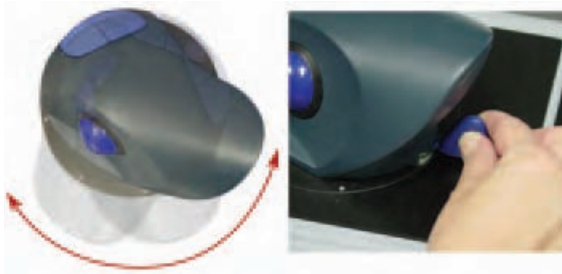
# Electronic Systems Sperry Marine

## FT Trackball

The entirely new ergonomically designed trackball supports the natural contours of your hand while giving you the smooth responsive control needed when making voyage management decisions. Clicking, pointing, scrolling, moving forward or back are accurately and easily accomplished with the finger controlled trackball.



*The operating control has a convenient thumb-operated trackball, with right and left click buttons on the front.*

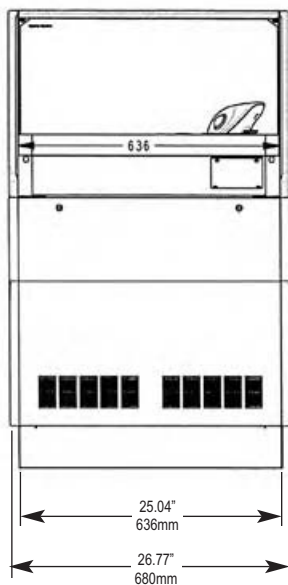


*The trackball device can be rotated through three different positions and locked in place for comfortable operation from any angle.*

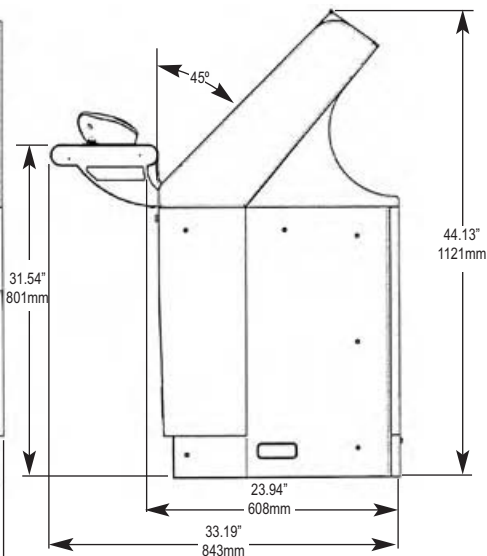


## Dimensions

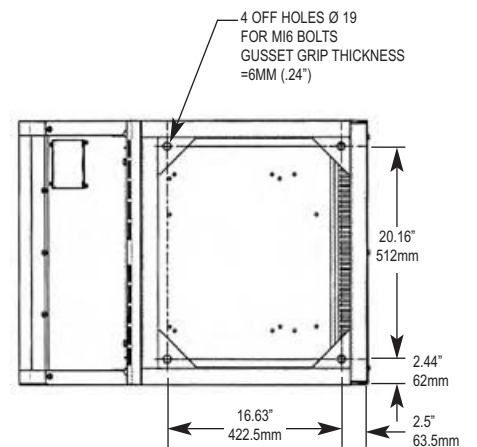
Front View



Side View



Bottom View



Over 400 Locations Worldwide

# Typical System Profile

## Sperry Marine

[www.sperry-marine.com](http://www.sperry-marine.com)

For more information, please contact:  
Sperry Marine

### AMERICAS

**Charlottesville, VA USA**

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Fax: +852-2581-9967

**Japan, Tokyo**

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**Holland, Vlaardingen**

Tel: +31(0)-10-4451600

Fax: +31(0)-10-4345015

**Norway, Bergen**

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Fax: +47-55-34-52-27

**United Kingdom, New Malden**

Tel: +44 (0)20 8329-2000

Fax: +44 (0)20 8329-2415

## Nav Equipment Interface



- Autopilot Interface



- ARPA Radar (2)



- Gyrocompass (2)



- Speed Log (1)



- GPS / DGPS (2)



- Printer (1)



- Wind Sensor (1)



- Echo Sounder (1)

## Configuration Alternatives



Deck Stand  
or



Table Top  
or



Flat Screen

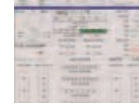


Electronics  
Kit

## ECDIS Options



Radar Video Overlay



Custom  
Conning Information  
Display



Course Mode - Joystick



Docking Page



Automatic Navigation &  
Tracking System (ANTS)



Navigation Planning Station  
(Stand-alone or Networked)



UPS

Certificate of Type Approval for Sperry Marine VMS - NAVIECDIS

# QinetiQ



## CERTIFICATE OF TYPE APPROVAL

(EC Certificate of Type Examination - Module B)  
(Marine Equipment Directive - 96/98/EC)

**Applicant:-**  
Sperry Marine  
1070 Seminole Trail  
Charlottesville  
VA 22901  
USA.

**Manufacturer:-**  
Sperry Marine  
1070 Seminole Trail  
Charlottesville  
VA 22901  
USA.

This is to certify that the applicant has submitted details of a:-

**Electronic Chart Display And Information System (ECDIS)  
With Backup, and Raster Chart Display System  
(COMMISSION DIRECTIVE 2002/75/EC – ITEM A.1/4.30)**

Of system type known and designated as:-

**Sperry Marine VMS - NA ECDIS**

(Comprising component parts and having technical characteristics shown in shedule 1) and that these have been assessed, tested and when used in a combination of component parts as described in the attached schedules, is CERTIFIED as complying with the relevant parts of:

**BS EN 61174:2002, "Electronic Chart Display And Information System (ECDIS)"  
BS EN 60945 : 1997 "General Requirements for Marine Navigation Equipment"**

(being specifications for Technical Characteristics and Methods of measurements equivalent to IEC 61174 and IEC 945), and published by the British Standards Institute.

It is also RECOGNISED that the equipment conforms to performance standards not inferior to those adopted by the International Maritime Organisation, and which are contained in Resolution MSC64(67), Annex 5, MSC86(70), Annex 4 and Resolution A694(17).

**SIGNED:**



**DATE of ISSUE:** 15<sup>th</sup> June 2006

Authorised Signatory

**DATE of EXPIRY :** 22<sup>nd</sup> December 2008

**Certificate Number:** QQ-MED-55/03-01R2

EU/USCG Mutual Recognition Agreement  
Council Decision 2004/425/EC

*This equipment category is not yet covered by the MRA*

This Certificate is Valid until expiry date shown, subject to the standard conditions of issue printed on the attached schedule  
Sperry Marine Inc. are Module D registered with QinetiQ in accord with standard condition 3, ref Certificate DQAS-11/03-SMI001

QinetiQ  
Cody Technology Park  
Ively Road, Farnborough



Maritime and Coastguard Agency  
The MCA is an Executive Agency of  
the Department for Transport

Extract of guidance notes to Chart carriage requirements of SOLAS V Reg 19

## Nautical Charts and Publications

These guidance notes should be read in conjunction with Regulations 19, 21 and 27, which cover the carriage of Charts and Nautical Publications. The Regulations revoke the Merchant Shipping (Carriage of Nautical Publications) Regulations 1998 (SI 1998 No. 2647)

### General

1. Regulation SOLAS V/1.4 allows Administrations to determine to what extent Regulations 15 to 28 apply to smaller vessels and fishing vessels. In the case of Regulation 19.2.1.4 the carriage requirements for charts and publications do not apply to the following:
  - a.) UK Ships of Class V.
  - b.) UK Ships which are neither passenger ships nor seagoing.
  - c.) New ships of class A,B,C or D
  - d.) Fishing vessels
  - e.) Pleasure vessels under 150 gt.

### Small craft

2. All small-craft users should note that Regulation 34 (Safe navigation and avoidance of dangerous situations) is not listed in Regulation 1.4 and therefore applies to ALL SHIPS ON ALL VOYAGES (Regulation 1.1). The definition of “ship” in this respect includes all small watercraft. Operators of small craft of the categories listed above should therefore have sufficient charts and published information on board to be able to plan the intended voyage and execute it safely. When the type and structure of a small vessel means that it is impracticable to carry charts and publications, the crew should have sufficient knowledge of the area of intended operation and of all local dangers and regulations so that they can complete the intended voyage in safety.

### Requirement to carry nautical publications

3.
  - a.) All ships, except those listed in para. 1 above, shall carry-
    - i.) Charts, as defined in Regulation 2.2 or an electronic chart display and information system (ECDIS) using Electronic Navigational Charts (ENCs) or Raster Navigational Charts (RNCs) to meet the requirements of Regulation 19.2.1.4 with the necessary back-up arrangements required by Regulation 19.2.1.5. The back-up arrangements may either be duplication of the ECDIS or a reduced folio of paper charts. (ANNEX 14 – Electronic charts contains MCA guidance and also includes IMO SN Circ/207 “Differences between RCDS and ECDIS”.) Advice on determining suitable backup is given in MGN 285; and
    - ii.) such adequate and up to date sailing directions, lists of lights, notices to mariners, tide tables and other nautical publications, as defined in Regulation 2.2 to meet the requirements of Regulation 19.2.1.4;

Nautical publications presented in electronic format are acceptable when issued by or on the authority of an authorised Hydrographic office or other relevant Government institution.

Recommendations for system installation and use aboard ships are included at Section 6.

- b.) All sea-going passenger ships, and all other ships of 300 gt or more and all other ships required by SOLAS to carry a radio installation, shall carry the International Code of Signals published by the International Maritime Organization. (See Regulation 21)

All ships to carry Volume III of the IAMSAR Manual (See Regulation 21 and the Guidance note which lists MCA exceptions to this requirement.)

Furthermore to comply with the Radio Regulations published by the International Telecommunications Union (ITU), ships to which the Merchant Shipping (Radio Installation) Regulations (SI 1998/2070) apply i.e. passenger ships and other ships of 300 gt or more on international voyages, when provided with equipment for use in sea areas A2, A3 or A4 i.e. beyond VHF range of coast stations, shall also carry the following publications of the ITU:

- List VIIA, the Alphabetical List of Call Signs and Numerical Table of Identity of Stations.
- The Manual for Use by the Maritime Mobile and Maritime Mobile Satellite Services.

### Charts

4. The charts or ECDIS referred to in Regulation 19.2.1.4 must be of such a scale and contain sufficient detail as clearly to show-
- i) all navigational marks which may be used by a ship when navigating the waters which are covered by the chart,
  - ii) all known dangers affecting those waters, and
  - iii) information concerning any ships' routing and ship reporting measures applicable to those waters.

All charts and publications must be of the latest obtainable edition and, be kept up to date from the latest relevant obtainable notices to mariners and radio navigational warnings.

### Publications

5. The following publications are considered to satisfy the requirements of Regulation 19.2.1.4
- International Code of Signals (IMO)
  - IAMSAR Manual Vol.III
  - Mariners' Handbook (UKHO)
  - Merchant Shipping Notices, Marine Guidance Notes and Marine Information Notes (MCA)
  - Notices to Mariners (UKHO)
  - Notices to Mariners – Annual Summary (UKHO)

- Lists of Radio Signals (UKHO)
- Lists of Lights (UKHO)
- Sailing Directions (UKHO)
- Nautical Almanac
- Navigational Tables
- Tide Tables
- Tidal Stream Atlases
- Operating and Maintenance Instructions for Navigational Aids Carried by the Ship

NOTES:

- i.) In the case of publications listed above, only those parts of the publication which are relevant to a ship's voyage and operation need be carried.
- ii.) Where the UK Hydrographic Office (UKHO) is given as the publisher, any other chart or publication which meets the definition in Regulation 2.2 shall be acceptable.

The MCA also recommends that ships carry a copy of "Safety of Navigation, implementing SOLAS Chapter V, 2002".

### Digital nautical publications -

#### 6. RECOMMENDATIONS FOR SYSTEM INSTALLATION AND USE ABOARD SHIPS

##### 6.1 System Installation

- 6.1.1 The following recommendations arise from consideration of the use of digital Nautical Publications on a vessel in compliance with requirements laid down in SOLAS Chapter V and relevant IMO Guidelines.

In conjunction with these Recommendations the following IMO Circulars should be consulted when implementing digital nautical publications:

MSC/Circ.891 'Guidelines for the on-board use and application of computers'

MSC/Circ.982 'Guidelines on ergonomic criteria for bridge equipment and layout'

MSC/Circ.1091 'Issues to be considered when introducing new technology on board ship'.

- 6.1.2 As a minimum, the hardware should consist of two computer systems (referred here as primary and secondary computers) each having the functionality of a processor unit, display, keyboard, pointing device (such as a mouse) and the means to load software and data updates.

- 6.1.3 The processor unit of the computer should be capable of running the official digital nautical publication software products in an effective manner, giving due regard to the specific requirements of the official software products, the operating system in use and the demands of other software products loaded on the computer. Full consideration should be given to the:

Operating System in use (eg Windows XP) – is it supported by the digital nautical publication products that will be loaded onto the system?

Processor speed (eg 1GHz) – is it fast enough to support the loaded products, particularly if nautical publication software will be operating simultaneously with other products?

Memory: (eg 256 MB) – is it large enough to support simultaneously nautical publication products and other running software?

Hard disk space free: (eg 1 GB) – is there enough space to load the programme, the data and the necessary updates?

Essential peripherals, (eg CD ROM, floppy disk, keyboard, mouse, internet connection) – are the right peripherals available to load, use and update digital nautical publication software and data?

- 6.1.4 The primary computer should be installed close to where the voyage is monitored. It should be designed to meet the environmental conditions defined in IEC60945 and be powered from the main and emergency sources of power on the bridge. The effective display area should measure at least 350 millimetres across the diagonal. The display should be able to be varied in brightness and contrast to enable viewing in all ambient light conditions. The lighting over the keyboard should be adjustable to enable use in all ambient situations. Care should be taken in positioning and setting-up the display and keyboard lighting so that it does not affect the night vision of bridge watch staff.
- 6.1.5 If the display and controls for accessing digital nautical publications are situated close to the conning position or to a look-out position the display at night should be set to appropriate night-time colours. Great care must be taken in setting brightness adjustments to prevent the display and the keyboard lighting from affecting the night vision of bridge watch staff.
- 6.1.6 An ECDIS capable of accessing appropriate digital nautical publications may be used as the 'workstation' for the use of such publications. However, digital nautical publications may only be used on ECDIS if the ECDIS equipment has been approved by the flag Administration (type approved) for this purpose.
- 6.1.7 The primary computer (if not an ECDIS) may also be used to run other software needed for essential bridge support functions, provided these are checked for compatibility with the officially approved products loaded. Digital nautical publications should be available for instant use at any time during the voyage.
- 6.1.8 On some ships, with a poor electrical supply, it may be necessary to power the primary computer system through an uninterruptible power supply (UPS). This is a self contained battery-driven power inverter that continues to supply

good quality electrical power, even when there are fluctuations in the ship's main supply. A UPS can also operate the computer system for some minutes even if there is a complete power failure. It cannot normally be considered to act as the emergency source of power because of the relatively short time before its batteries are exhausted.

6.1.9 A secondary computer is required in case of failure of the primary system. It is ideally situated on the bridge when it should comply with the requirements of Paragraphs 1.2-1.5 above, except

(i) It is not necessary for it to be provided with an emergency source of power.

(ii) It need only comply with the EMC requirements of IEC60945

A network solution can inherently provide a good backup. In this instance prior consideration of the preferred secondary workstation should be made. This should be documented within the ship's bridge procedures. It should be noted that not all officially approved products currently support network operation.

6.1.10 If not mounted on the bridge (and if permitted by the flag Administration), the secondary system may be a good quality office system connected to the ship's normal power supply. It should comply with the requirements of Paragraphs 1.2 and 1.3 above and be situated in a convenient position for access by bridge personnel. It should not be in an area subject to high levels of vibration, heat or humidity, which could lead to damage of the system. The effective display area should measure at least 350 millimetres across the diagonal.

6.1.11 The secondary system may be used for other applications of a critical or non-critical nature, provided that any software loaded is approved by the master and is checked for compatibility with the officially approved products loaded. During the voyage it must be available for instant access to digital nautical publications in the event of a failure of the primary system.

6.1.12 If the secondary system is not on the bridge it is recommended that it is also connected to a colour printer to allow the printing of critical data needed for use at the chart table or elsewhere on the bridge.

6.1.1 A secondary system is not required if the equivalent paper version of the digital nautical publication is available on the bridge and is maintained up-to-date. In that case the bridge computer system need only comply with the EMC requirements of IEC 60945 and not the full environmental requirements specified for the bridge environment.

6.1.14 In placing equipment on the bridge care must be taken to comply with the requirements of SOLAS Chapter V Regulation 15 'Principles relating to bridge design, design and arrangement of navigational systems and equipment and bridge procedures'.

- 6.1.15 Consideration must be given to protecting the primary and secondary computers (including a network system, if used) against computer viruses. This may be by the installation and regular update of anti-virus software or by strict bridge instructions prohibiting unauthorised use, including the loading of non-approved software or data.

## 6.2 System Use

- 6.2.1 Training on the system should be provided to enable operators to use it effectively and maintain the databases to be fully up-to-date. Users new to the particular vessel should be familiarised with the equipment set-up and with the vessel's bridge procedures concerning the use of digital nautical publications, prior to using the equipment.
- 6.2.2 Updates available in port should be applied before passage planning commences and before leaving port. If updates are received at sea they should be applied as soon as possible. Any changes relevant to the execution of the passage plan should be noted on the passage plan
- 6.2.3 Updates need to be applied to both primary and secondary systems
- 6.2.4 Records should be kept of when updates are received and applied
- 6.2.5 During passage planning it should be checked that any licences concerning the use of the software and its updates will remain valid for a period in excess of the expected worst-case voyage duration. If this is not the case corrective action needs to be taken.
- 6.2.6 A status check of the primary and secondary systems should be made before leaving port and at least once per day in order to ascertain the availability of the systems. This information should be recorded in the ship's log.
- 6.2.7 In the event of a failure of the primary or secondary system it should normally be repaired at the next port of call, unless the facilities for such a repair are not available. In the latter case proper thought and action needs to be taken to minimise the effects of failure of the remaining system. That could include, for instance, making a print-out of critical data that may be needed during the voyage before the voyage commences, directly from the digital nautical publication
- 6.2.8 Bridge instructions should be in place to prohibit any unauthorised use of the primary and secondary systems, such as: the loading of additional software; change of software or hardware configuration; and any use by untrained staff.

### Associated Documents

Annex 14 – Electronic Charts

MGN 285 – Electronic Charts – the use of risk Assessment Methodology when operating ECDIS in the Raster Chart Display System (RCDS) Mode.

MGN 319 – Acceptance of Electronic Chart Plotting Systems for Fishing Vessels under 24m and small vessels in commercial use (Code boats) up to 24m load line length

MAIB flyer into the grounding of *Pride of Canterbury*

## FLYER TO THE SHIPPING INDUSTRY

### *Pride of Canterbury*

#### Grounding of a passenger ferry on a charted wreck while awaiting Dover port to reopen

Image courtesy of FotoFlite



On the afternoon of 31 January 2008, while sheltering off the port of Dover in bad weather conditions, the passenger ferry *Pride of Canterbury*, with 275 passengers and 101 crew on board, grounded on a charted wreck. She sustained major damage, including the total loss of her port controllable pitch propeller hub and a section of tail shaft.



Damage sustained by *Pride of Canterbury*

*Pride of Canterbury* was on a fixed service between Dover and Calais, and the occasional closure of either port was a feature of the run, especially during winter months. P&O Ferries, the operator of *Pride of Canterbury*, had produced comprehensive passage plans between ports served by the vessel. In addition, there was a selection of plans for other probable sea passages. However, there were no contingency plans produced that suggested where *Pride of Canterbury* should wait in the event of a closure of one of the regular ports.

On this occasion, Dover port closed just before *Pride of Canterbury* arrived within port limits. Consequently, she proceeded towards the master's preferred holding area, which was "The Downs" off Deal, Kent, to await the port reopening. "The Downs" area is quite restricted in the available sea room and surrounded by shallow waters and banks.

During the waiting period, procedures and bridge team management became ineffective:

- No passage plan was developed; dangers and hazards were not identified; and no-go areas were not marked on the chart.
- On board *Pride of Canterbury*, paper charts were the primary means for navigation. However, positions were only sporadically plotted and the paper chart was not consulted at the crucial time.
- The OOW was changed on an ad-hoc basis, and the handovers were not structured, such that important information might have been lost.
- Navigation was conducted by eye and by reference to an electronic navigational chart display (ENC). None of the bridge team had been trained in the use of ENC, and the settings were inappropriate such that key dangers would not have been displayed.
- Throughout the waiting period, there were a number of telephone calls to the bridge, principally regarding matters on the vehicle decks, which distracted the bridge team from their primary function of navigation and lookout.

### **Safety Lessons**

- Charts covering likely contingency waiting areas should be prepared and be ready for use before the start of the voyage, and they should include clearly marked dangers and hazards.
- The principles of effective bridge team management should be understood and practised by bridge teams at all times.
- When additional aids to navigation, such as electronic navigational systems, are fitted to the vessel, the operators should be given effective training in the use and limitations of the equipment, even if the equipment is not intended to be the primary means of navigation.
- Where navigation bridges are the focus for frequent requests for non navigational-related information, systems should be in place to ensure that watchkeeping staff are not distracted at critical times.

Further details on this accident and the subsequent investigation can be found in the MAIB's investigation report, which is posted on its website:

[www.maib.gov.uk](http://www.maib.gov.uk)

Alternatively, a copy of the report will be sent on request, free of charge.

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