



TECHNICAL SPECIFICATION

VisionMaster FT Radar & Chart Radar Features CAT1 and ECAT2

The following specifications relate to release 4.1.3 series of VisionMaster FT (IEC62388 version)

RADAR SYSTEM PERFORMANCE

- Minimum Range: Less than 35m using 10m² target, measured with short pulse, 4.5m antenna height, on 0.25 and 0.5nm range scales
- Range Discrimination: Better than 35m on 0.75nm range
- Bearing Discrimination: Better than 1.3° with 8ft X Band antenna
Better than 2.4° with 12ft S Band antenna. (1.5nm range scale using 10m² reflector at a range of 1nm.)
- Range Ring Accuracy: 1% of the maximum range of the scale in use or 25m whichever is the greater.
- Radar Bearing Accuracy: Better than $\pm 1^\circ$.

DISPLAY FEATURES

Range Scales

0.125nm to 96nm (with range rings at 0.025nm to 16nm with accuracy of 1% or 25m whichever is greater)

Range Units

The system can be configured in nautical miles (default), kilometres, kilo yards, statute miles and cables

Bearing Scale

1, 5 and 10° marks labelled every 10°. The non-linear scale adjusts automatically as own ship's position updates on the screen.

Advanced Video Processing

16 level digitisation, unique anti-clutter system, scan filtering, target enhancement, video build up and video fade, peak intensifications, and trails decay.

Electronic Cursor

- Range and bearing (true or relative) and reciprocal bearing
- Latitude and longitude
- Time To Go to cursor position.

Presentation Modes

- Stabilised: North Up & Course Up
- Unstabilised: Head Up

Motion Modes

- Relative or True Motion
- Automatic resetting in True Motion

Trails Modes

- True and relative trails available (true trails require azimuth stabilisation)
- Ground or water stabilisation
- Trails modes: off, short, medium, long, permanent
- Trails cleared on operator demand
- Trails retention on switching one range scale up or down
- Trails retention on switching between true and relative trails

Off-Centring

- Off-centring up to 70% on all range scales except 96nm
- User selectable maximum view ahead and re-centring

Daylight & Night Presentation Modes

Five user selected presentation colour modes give optimum usability from bright daylight through dusk and night operation.

Relative brilliance of certain features (for example VRM/ERBL) can be individually preset and adjusted by the operator.

Variable Range Markers (VRM) and Electronic Bearing Line (EBL)

Two VRMs and two EBLs, presented as an electronic range and bearing line (ERBL) when VRM is off. Both may be off-centred and dropped or carried in stabilised modes.

Range readout from 0.0nm to 96nm. Range resolution from 0.001 nm to 0.1 nm, range scale dependent. Range accuracy better than 1% of range scale in use or 25m, whichever is greater.

True or relative bearing and reciprocal bearing readout to a resolution of 0.1°. Bearing accuracy $\pm 1^\circ$.

iWindow

iWindow* provides concise graphical and numerical conning information that can be viewed in Radar, Chart Radar and ECDIS watch modes.

Seven preconfigured operator selectable side panels featuring Docking, Sea, Environment and a Default are provided. Each of panel can be configured at commissioning allowing a wide range of customised data views to suit specific task or operational requirements.

Data sources can include, but is not limited to:

- Heading
- Position
- Speed
- SOG & COG
- Pitch & roll
- ROT
- Rudder & thruster data
- Wind speed & direction (true & relative)
- Set & drift
- Distance & time to go to next waypoint
- Depth
- Final ETA
- Leg Bearing & next waypoint number

**The iWindow feature is only available on systems with widescreen displays that have been correctly configured to widescreen format.*

OWN SHIP FEATURES

Consistent Common Reference Point (CCRP)

The CCRP ensures ranges, bearings and other calculations are taken from a consistent position on the vessel, defined when commissioning.

Own Vessel Presentation

- Heading Line
- Optional Stern Line
- Display of antenna position
- Beam line

Own Ship Vector

Own ship vector using current velocity. Operator can select vector tick marks and tick mark interval (in minutes).

Predicted vector using velocity and rate of turn shows predicted own ship's movement when manoeuvring.

Predicted path using velocity, rate of turn and ship's size characteristics shows predicted path of ship. Intended for use when navigating in constrained waters.

Trial Manoeuvre

Available in all presentation and motion modes. Operator selects time to manoeuvre, speed during manoeuvre, rate of turn and final course.

Display of resultant CPA and TCPA for target in single target tote.

True Scale Display of Own Ship Outline

It is now possible to display a true outline of own ship/platform on screen. Using multiple points, the vessel shape can be drawn to provide a precise outline.

TARGET FEATURES

Tracker Performance

Automatic or manual acquisition of up to 100 tracked targets

Meets full IMO standard for standard and high speed craft

Continuous tracking for targets detected for 5 out of 10 consecutive scans.

- Acquisition Range: 0.25nm to 40nm
- Tracking Range: 0.25nm to 40nm
- Maximum Tracking Velocity: 150 knots relative

Velocity trend within 1 minute, full accuracy to IMO standard within 3 minutes.

Auto Acquisition

2 annular and 2 polygonal zones available in all presentation modes and all motion modes.

Target Alarms

- Closest point of approach/bow crossing range (CPA/BCR): 0.1 nm to 20 nm
- Time to CPA/bow crossing time (TCPA/BCT): 1 min to 999 min
- Lost Target Alarms Operator selectable option

Alarms are audible with identifying symbol on screen where appropriate.

Operator adjustable range limit for lost target alarms.

Target Features

- AIS Target capacity: 240 AIS targets
- User selected target priority: Tracked or AIS targets
- Target Vectors: True or relative
- Target Vector Length: 1 to 60 minutes
- Target Identification: Numerical identifier, target name or both
- Target Naming: By operator or from AIS, when available
- Target Past Positions: Display of up to 4 past positions. Time intervals available are 15s, 30s, 1 min, 2 min, 4 min, 8 min or 16 min
- External Target Interface: Output of tracked targets and optionally AIS targets (TTD, TTM or TLL).

AIS Interface

AIS safety message processing and display

Displays ATONs, SAR craft and base stations

Target Totes

- Single Target Tote: Tracked target and AIS data
- Multiple Target Tote: Ordered by range
Ordered by CPA
User selected targets
- AIS Information: Vessel class, name, call sign, MMSI, destination, type, heading, rate of turn, navigational status, latitude, longitude readout and position accuracy.

Test Targets

- Fixed Position Test Targets: Multiple test targets for testing tracker integrity
- Moving Test Targets: 5 test targets with user selected range, bearing and velocity

Target Track Repair

Target repair is used to reposition tracked target synthetics when they become separated from the target video. This is done by moving the tracked target origin to its new position whilst maintaining the following target data:

- Target ID number
- Target name
- Existing Past Position dots
- Velocity
- Target Manoeuvre

NAVIGATION TOOLS

Parallel Index Lines

Index lines can be created, displayed and stored in sets of up to 15 lines. The lines are fully adjustable in range and bearing and can be truncated. Shared between other VisionMaster FT systems on same network. Exportable by USB memory device to other VisionMaster FT systems.

Radar Maps

Selection of predefined mapping objects (lines, danger points, areas, buoys etc) can be defined in the presentation area. The maps can be saved as groups and exported. They can also be shared between other VisionMaster FT systems on the same network or by exporting them via USB memory device.

Parallel Cursor

Two types provided - full cursor and half cursor. True and relative orientations.

Lat Long Grid

In North up mode.

Route Plan

Route plans can be created, edited and monitored. The information can be shared between other VisionMaster FT systems on same network and maybe exported to other VisionMaster FT systems via a USB memory device.

Speed limits can be added to the route legs by the operator.

The following readouts are available in monitoring rate mode:

- Cross track distance
- Time to wheel over position
- True bearing of leg
- Distance to wheel over position

Off track alarm and wheel over position notification alarm are available with operator selectable limits.

Routes can also be received from external equipment via an industry standard IEC61162 interface.

Route Based Speed Planning and Control

When a route is being monitored, the operator can define a plan for speeds along the route, and see the effect of these speed plans on arrival times. Alternatively, the operator can specify an arrival time and have the system compute a speed plan that meets this arrival time.

Lines of Position (LOP)

The geographic location of own ship can be determined by using lines of position (LOP), which are created by taking bearings and/or radar measurements from own ship to suitable objects on the radar display. When two or more LOPs are created a fix of own ship's position may be obtained.

SENSORS

Navigation sensors should be compatible with IEC 61162-1 & IEC 61162-2

Serial interface to RS232, RS422 and RS485

Accepts the majority of gyro and serial compass inputs. Serial compass inputs message rate of 50Hz required. An alternative "special compass" option is available for 1:1, 36:1, 90:1, 180:1 compasses.

- Pulse log input
- GPS interface
- Manual set & drift adjustment
- Automatic calculation of set and drift

TRANSCEIVER CONTROL FEATURES

Sector Blanking

For special applications radar transmission can be inhibited in two sectors indicated on the display. (Total blanking up to 340°).

Auto Tuning (AFC)

Fully automatic with manual backup.

Pulse Lengths

Three pulse lengths are available.

Range Scale (nm)	Range (nm)	Ring	Pulse Length
0.125	0.025		Short
0.25	0.05		Short
0.5	0.1		Short or Medium
0.75	0.25		Short or Medium
1.5	0.25		Short or Medium
3.0	0.5		Short, Medium or Long
6.0	1.0		Medium or Long
12.0	2.0		Medium or Long
24.0	4.0		Medium or Long
48.0	8.0		Long
96.0	16.0		Long

Interswitch Control

Control of interswitch integrated into display. Master/slave indication. S/X band indication. Interswitch configuration is available on request.

OTHER NAVIGATION FEATURES

Dual Channel (Purchasable Option)

The Dual Channel option provides the ability to:

- Display radar from two independent transceivers
- Control each transceiver independently
- Full interswitch control of both channels
- Target tracking of both channels

Precision Anchoring

Anchoring enables the operator to plan an anchorage, monitor the anchoring status, control the display of the anchorage parameters, and monitor the anchor drag after the ship is anchored.

Man Overboard (MOB)

The MOB function of the system enables management of a MOB emergency. The estimated position of the person in the water is calculated based on the Set and Drift values that were active when the MOB operation was initiated.

Search and Rescue Patterns

The search and rescue (SAR) patterns can be used to facilitate search and rescue exercises at sea. The operator is able to select one of eight recognised patterns as provided by International Authorities. Once the selected SAR pattern is displayed on screen the operator has the ability to customise the pattern as required.

Station in Control

Each node in the system may be configured to be either “always in control” or “never in control”. Many VisionMaster FT functions will be unavailable to the operator at nodes configured as “never in control”.

Double-Ended Ferry Support

VisionMaster FT provides operators of double-ended ferries the capability to select forward or reverse direction, and the system will make necessary adjustments to the user interface to maintain an accurate navigation picture. Selection of direction can be commanded either via external discrete signal or by HMI menu selection.

ECDIS Integration

The system is fully integrated with the VisionMaster ECDIS and legacy VMS products. Next Turn EBL tools used on the Sperry Voyage Management System can be displayed.

Weather Fax Web Server Interface

The operator has the capability to view weather fax information on the VisionMaster FT display via an HTML web browse interface. With a click of a button, a new window is opened which automatically connects to the service provider’s server on the navigation network. This facility is available on Radar and Chart Radar when in standby mode. Currently, this interface facility is only compatible with Furuno’s FAX30 product.

STATIC SITE FEATURES

The following dedicated Static Site feature sets are available within the VisionMaster FT system.

Target Anchoring Watch

Anchor watch allows the operator to verify that anchored vessels do not go adrift. The operator can select a tracked or AIS target and an anchor watch circle will be drawn centred on each target’s initial position. An alarm will be raised if the target exits the circle. The radius of the anchor watch circle centre can be adjusted for each target.

Target Identifier Reset

The operator is able to reset the target numbering so that a new target can take the lowest number available.

Remote Transceiver Separation

For inter-switched systems, the transceiver separation can be set between 0 and 9,999m.

Temporary Display of Heading Line

For static site application, the heading line is only displayed for a short period when selected by the operator.

Target Carried EBL/VRM

It is possible for the operator to designate a target as the centre point for EBL/VRM1. The EBL/VRM will be carried with the target until the target is cancelled.

When the Static Site feature set is selected the following features are automatically disabled:

- Motion mode selection (always relative motion)
- Ground/water stabilisation mode selection
- Course up presentation mode
- True/relative trail selection (true trails only)
- Target auto drop
- Bow crossing
- Route planning, monitoring and ETA calculator

- Own ship graphic and data:
 - Own ship vector, outline and AIS
 - Predicted ship, vector and path
- Speed and rate of turn readouts
- Trial manoeuvre
- Evaluation of Chart Dangers
- Track Control
- Speed and Propulsion control
- Echo reference selection
- Anchoring
- Next time TBL
- Lines of position
- Man overboard

CHART RADAR FEATURES CAT1C and ECAT2C

Supported Chart Types

The Chart Radar facility allows vector charts to be displayed. The system supports the following chart data formats:

- C-MAP Professional
- C-MAP Professional+
- C-MAP ENC
- S57 (unencrypted)
- S63 (encrypted)
- VPF/DNC (MIL-STD-2407)

Chart Display Modes

Filled, Unfilled, Off

OTHER SYSTEM FEATURES

Commissioning

- All system parameters set up via full screen display menu
- Central alarm system interface
- Interface to the Sperry central alarm management system using industry standard IEC 61162-1 messages

Extensive features are available to the commissioning engineer. The settings are transferred between nodes on the system

Diagnostics

The system has extensive built in diagnostics to monitor and check the systems across any node in the system. Examples are critical voltages and currents in the transceiver. The system continuously monitors itself for correct system status and will raise an appropriate alarm should a fault condition be detected.

Screen Recording and Playback

The screen recording and playback facility enables the operator to record screen captures in intervals of up to 12 hours. Once recording is complete, the operator is able to playback through the Playback watch mode within VisionMaster FT. Controls such as pause; fast forward and rewind are provided.

iVideo (Purchasable Option)

iVideo feature allows the operator to view CCTV or other video feeds in 4 mpeg format on the display. Multiple video feeds can be streamed over the network using industry standard protocols and the operator can select which of these feeds is displayed. Multiple feeds can be displayed simultaneously.*

*Bandwidth and protocol constraints apply.

iHelp

The system incorporates an extensive context sensitive help facility. In transmit mode the system shows quick help facilities and in standby mode the extended help facility includes access to the operator manuals.

Security

VisionMaster FT has safeguards built into the system architecture and configuration that reduce vulnerability to viruses. Mariners are restricted from accessing the underlying operating system, thus preventing users from browsing through directories or running/copying files from a USB device or CD/DVD. When the VisionMaster application reads data from these devices - such as loading a radar map or installing chart data – the specific feature checks the data for validity.

TYPE APPROVAL COMPLIANCE

Available as the following options:

- CAT 1 Radar (340 mm bearing circle)
- CAT 2 Radar (250 mm bearing circle)
- Enhanced CAT 2 Radar (CAT 1 radar functions on a 250 mm bearing circle)
- Chart Radar variants (CAT1C, CAT2C)
- High Speed Craft variants (CAT1H, CAT1HC, CAT2H, CAT2HC)

Fully meets the requirements of:

- IMO MSC.192 (79)
- IEC 62388 edition 1
- IMO MSC.191 (79)