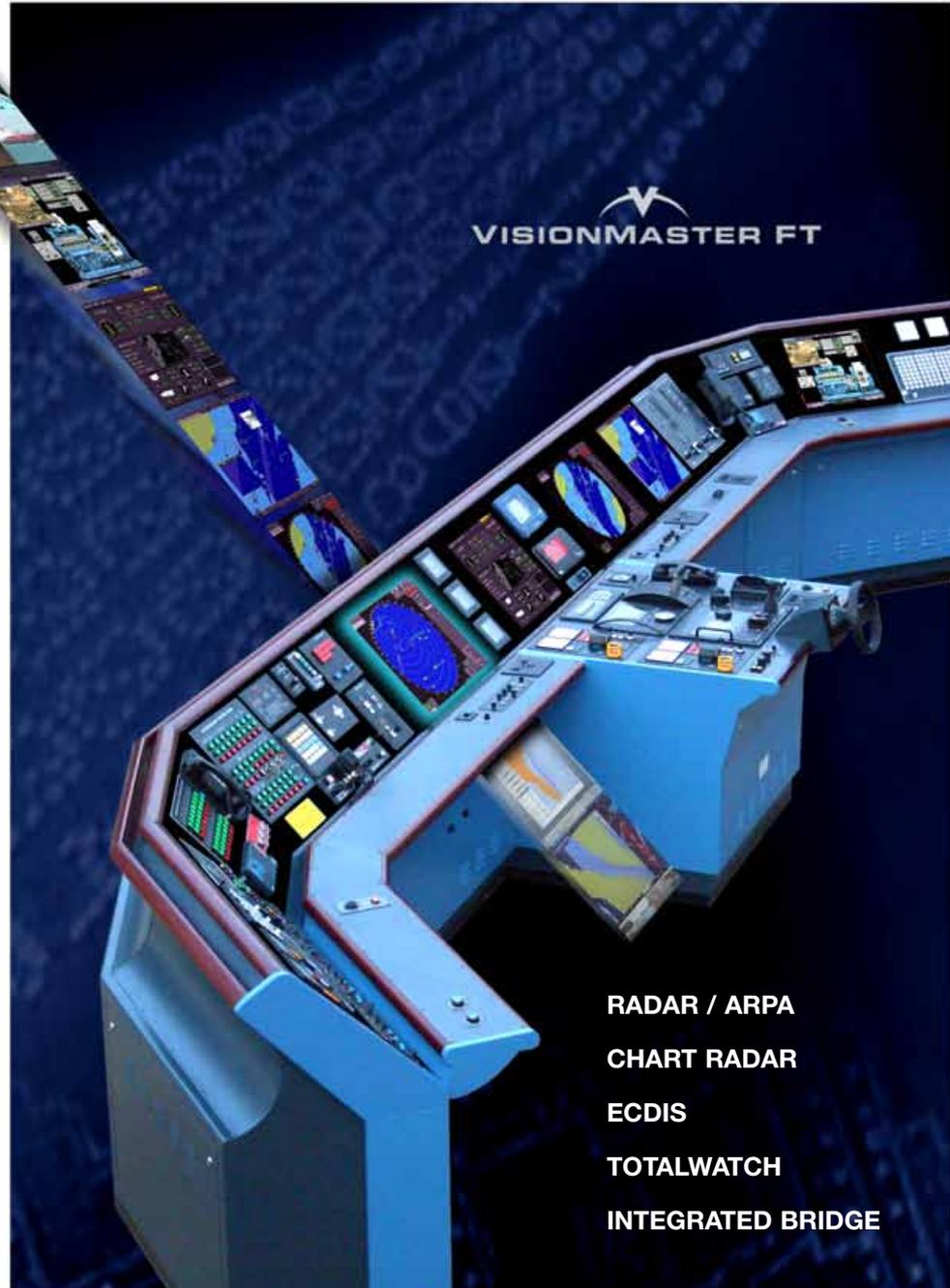


NORTHROP GRUMMAN

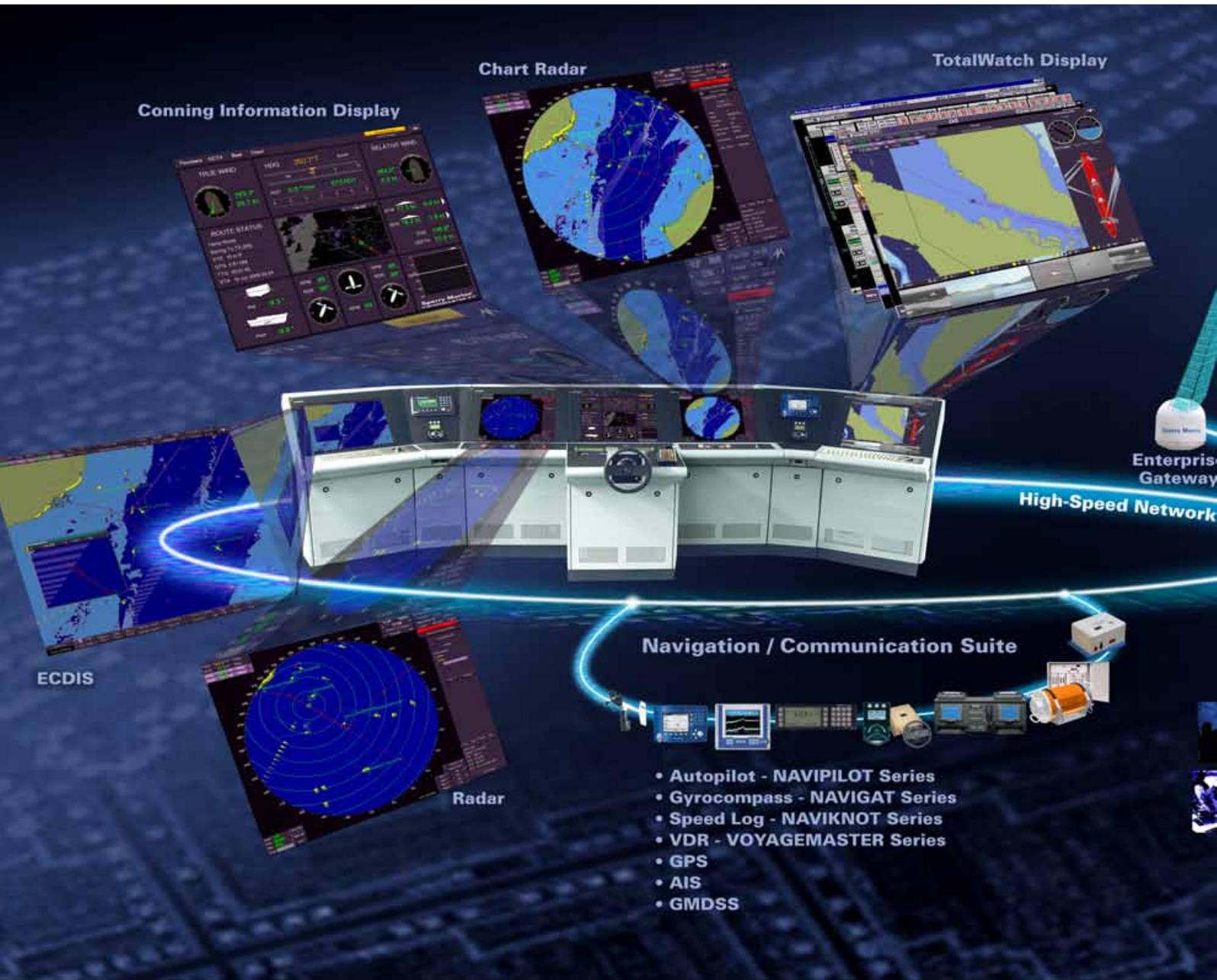
VISIONMASTER FT Series

Sea It Your Way



RADAR / ARPA
CHART RADAR
ECDIS
TOTALWATCH
INTEGRATED BRIDGE

Sperry Marine



Navigation / Communication Suite

- Autopilot - NAVIPILOT Series
- Gyrocompass - NAVIGAT Series
- Speed Log - NAVIKNOT Series
- VDR - VOYAGEMASTER Series
- GPS
- AIS
- GMDSS

VISIONMASTER FT, the newest advancement...

in navigation system technology from Sperry Marine, provides the performance and scalability to let you "Sea It Your Way."

The VisionMaster family of products includes:

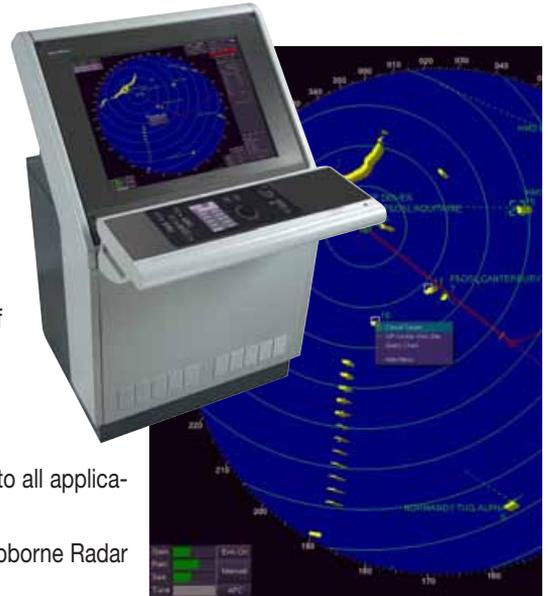
- **Radar/ARPA.** Type-approved for both standard and high-speed craft, this radar includes Sperry Marine unique performance enhancements such as ClearVision clutter suppression and advanced target correlation.
- **Chart Radar.** Integrates electronic chart and radar displays for improved watchkeeping efficiency and safety at sea.
- **ECDIS.** The Electronic Chart Display and Information System not only meets all IMO requirements for paperless

navigation, but also provides the industry's most advanced capabilities for voyage planning and chart management.

- **TotalWatch.** Multi-function workstations at which any VisionMaster function can be selected as a Watch Mode. Having everything available at a single workstation maximizes situational awareness for each bridge watchkeeper, increasing safety, enhancing navigation performance, and enabling reduced manning.
- **Integrated Bridge Systems (IBS).** Sperry Marine offers VisionMaster-based Integrated Bridge Systems to meet the certification requirements of all major international organizations, standards, and notations.

VISIONMASTER FT RADAR/ARPA

The VisionMaster FT Radar/ARPA is the heir to the Sperry Marine BridgeMaster series of radar products, which have established an unmatched reputation for reliability and performance with more than 18,000 units delivered worldwide. With VisionMaster FT, Sperry Marine moves the bar to an even higher standard. The result is the world's most dependable and advanced series of high-performance radars, providing the ultimate in safe navigation and situation awareness.



Type-Approved Performance

VisionMaster FT Radars are fully Type Approved to all applicable international standards, including:

- IEC/EN 60936-1 (Shipborne Radar) and -2 (Shipborne Radar for High-Speed Craft)
- IEC/EN 60872-1 (Automatic Radar Plotting Aid (ARPA))
- IEC/EN 60945 (Marine Navigation Equipment) Upgrade versions of VisionMaster FT will exceed the full requirements of the new Shipborne Radar performance standard (IEC62388) coming into force in 2008.

Advanced Clutter Suppression

VisionMaster FT Radars incorporate ClearVision as a standard feature. This sophisticated automatic clutter suppression technology makes it easier for watchstanders to identify small weak targets in the presence of sea or rain clutter without manually adjusting gain or clutter controls.

Target Acquisition

VisionMaster FT Radars automatically acquire and track up to 100 targets at relative speeds up to 150 knots. Targets can be acquired by either two guard zones or an operator-configured footprint area. AIS-selected target acquisition (up to 100 targets) is also provided as an option.

Interswitching

VisionMaster FT Radars provide digital controlled interswitching to interface up to six transceivers to up to six displays.

Compatibility

The new VisionMaster FT workstations are fully compatible with BridgeMaster antenna and transceiver configurations, and can easily be retrofitted with existing BridgeMaster installations. A full stand-alone console or a kit for installation of the electronics in existing cabinetry is available.

Ease of Installation

The VisionMaster FT radars are designed for easy low-cost installation and commissioning. A serial data format is used to communicate between the transceiver and workstation, minimizing cable runs. Commissioning is accomplished through a series of intuitive full-screen menu prompts.

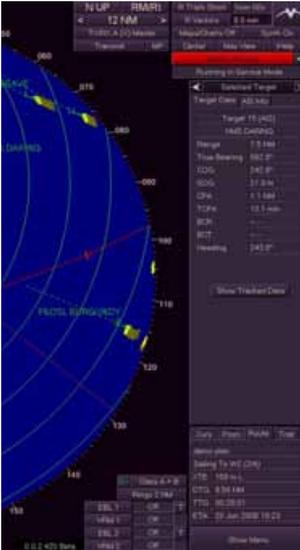
Dual-Channel Option

Dual-Channel capability integrates data from two transceivers for display at a single screen, providing unsurpassed situational awareness.



Sea It Your Way

Standard Features

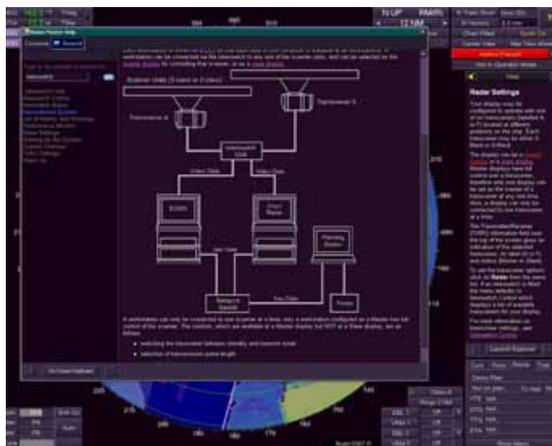


- Flat-screen high-resolution TFT display
- Complete ARPA functionality
- Interswitching
- ClearVision automatic clutter suppression
- Improved small target detection
- VDR and AIS interfaces
- Tracks up to 100 radar and AIS targets
- Multi-layer user-created radar maps and voyage plans
- Multi-purpose display window for user selectable information
- iUSB storage device port
- Basic Control Panel with ergonomic trackball control
- Online Operator's Manual including innovative iHelp functions

Options

- Dual Channel feature permits data from two separate transceivers to be integrated for display on a single screen
- Interface kit for BridgeMaster II Antenna / Transceiver configuration
- Upgradeable to ChartRadar
- Enhanced and Advanced Control Panels
- Upgrade kits to TotalWatch Multi-function workstation (i.e., ECDIS, etc.)
- Electronics kit configuration for fitting into a third-party console
- Closed Circuit Television (CCTV) display window

VISIONMASTER FT RADARS



iHelp

All VisionMaster FT products have three types of help features:

- **Tool Tip** - move the cursor over an area on the display and a window pops open with relevant information
- **iHelp Button**- additional help information is provided by a simple point and click process
- **iHelp Interactive Manual** - Hyperlinked, browser-based, searchable technical manual provides complete online operation and maintenance information

Control Panel Configurations



Basic (Standard)

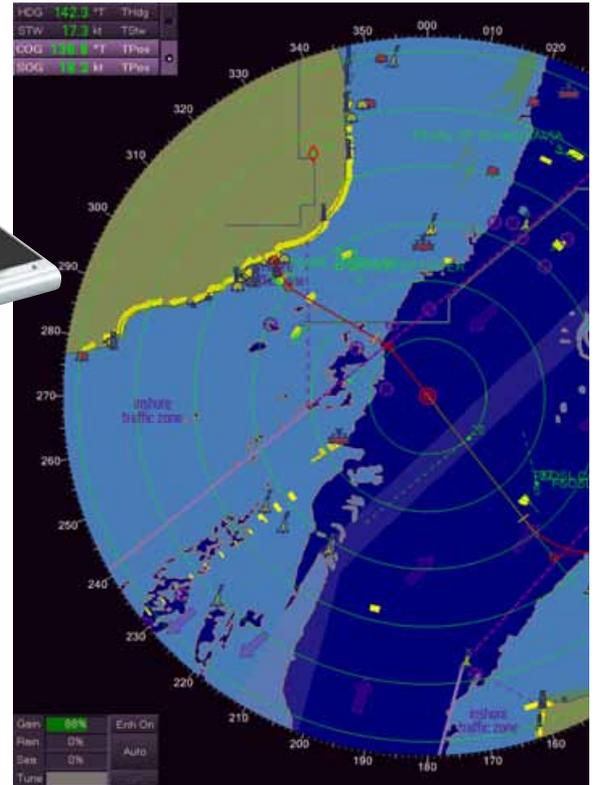
- Provides analog controls over common functions

Enhanced (Optional)

- Provides additional functionality employing easy to use touchscreen control
- Provides additional display area for navigation and other relevant data

Advanced (Optional)

- All the functionality of the Enhanced configuration, plus joystick control of VisionMaster functions



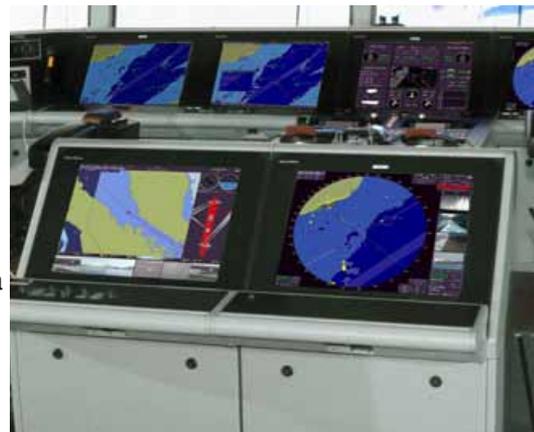
VISIONMASTER FT CHART RADAR

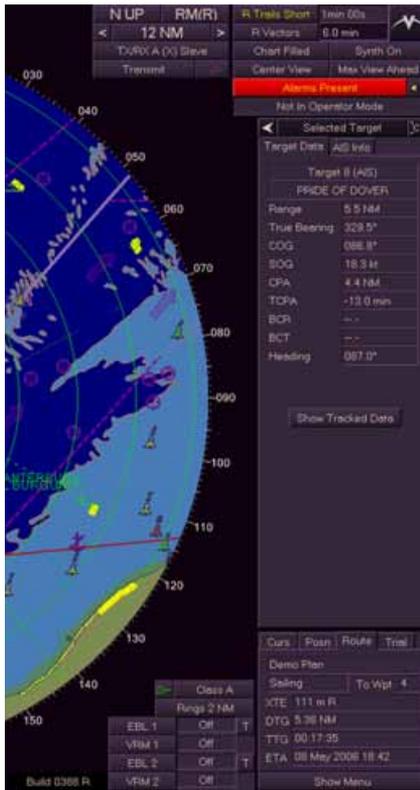
Chart Radar is a software upgrade to the VisionMaster FT Radar/ARPA, which integrates basic electronic charting capability with the full radar functionality for improved watchkeeping efficiency and safety at sea. The Chart Radar configuration is type-approved to IEC/EN 60936-3 (Radar with Chart Facilities) requirements for both standard and high-speed craft. In addition the Chart Radar complies with all the applicable standards for Radar/ARPA.

With VisionMaster FT Chart Radar, user-selectable display modes provide maximum situation awareness. The selectable Filled Chart mode shown above depicts land, water depths, and chart objects with unique colors.

Electronic Chart Capability

Chart Radar displays official ENC vector-format charts, integrated with the radar picture. The density of displayed ENC chart information is selectable by the user, ranging from a simplified presentation of shoreline and nav aids to a fully detailed display. Voyage plans from the VisionMaster FT radar are automatically overlaid on the chart display. Charts may be uploaded into the system through a standard CD-ROM or DVD-ROM or via the optional Performance Based Navigation VisionMaster FT GateWay.



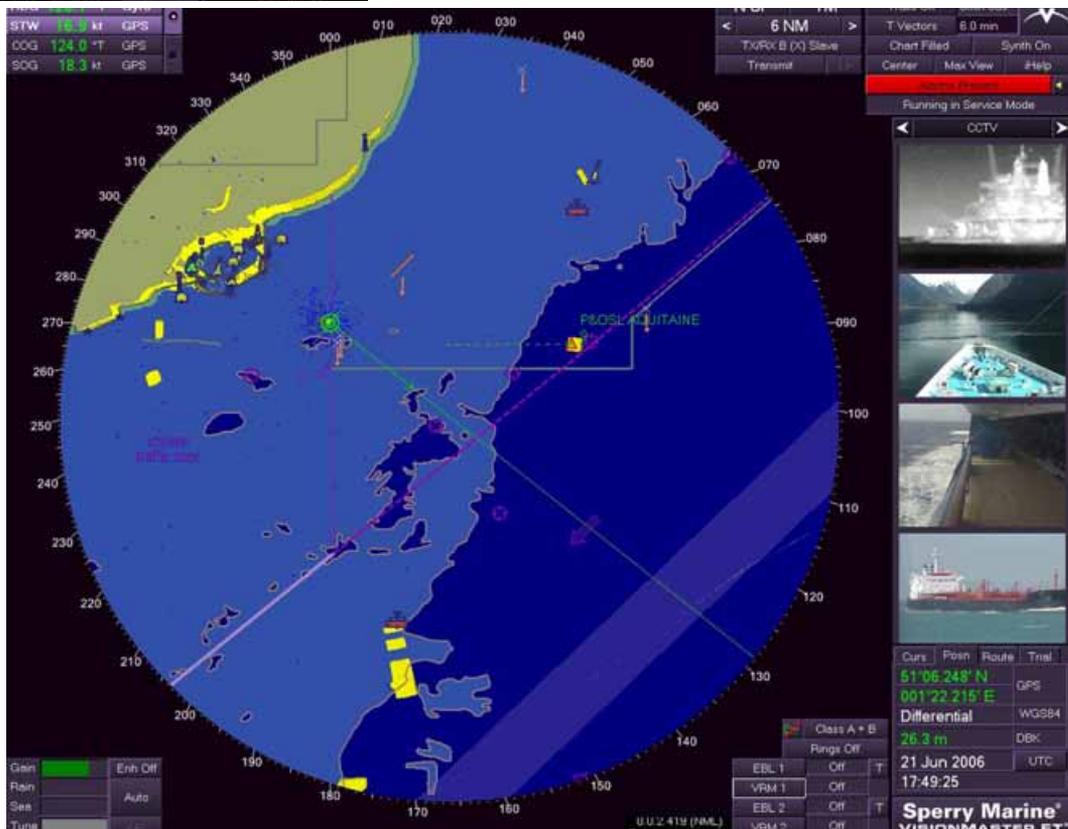


Standard Features

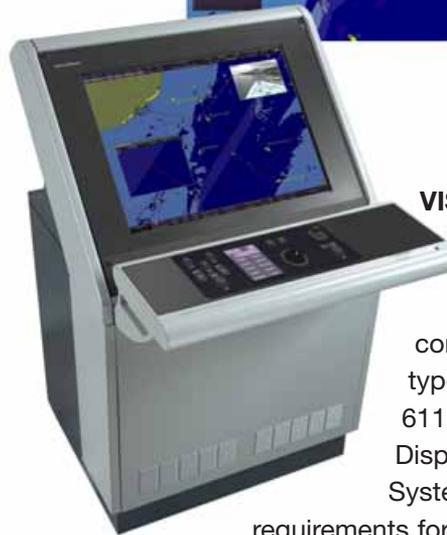
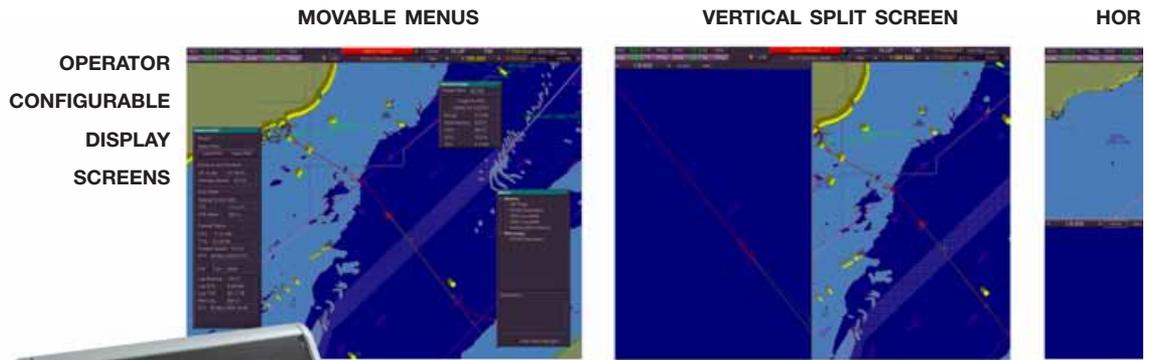
- All standard functions and capabilities of VisionMaster FT Radar/ARPA
- User-selectable density of chart layers
- Choice of filled or unfilled picture
- Five-level day or night display modes
- Reads standard ENC vector cartography
- Library of chart objects to customize display

Options

- Electronics Kit Configuration for fitting into a third party console
- Enhanced and Advanced Control Panels
- Closed Circuit Television (CCTV) display window
- Dual Channel facility that overlays the output on two transceivers in a single seamless display format
- Upgrade Kits to ECDIS and additional TotalWatch functions



The Closed Circuit Television (CCTV) option allows shipboard CCTV screens to be displayed within the interactive information area of the Chart Radar display.



VISIONMASTER FT ECDIS

The VisionMaster FT ECDIS provides a complete IMO-compliant type approved (IEC 61174tdz) Electronic Chart Display and Information System. It also meets the

requirements for navigating without paper charts when installed with a backup ECDIS.

The system's Universal Chart Manager is designed to work with a broad range of authorized vector and raster charts, including S57, C-Map, ARCS and PRIMAR. Charts may be uploaded directly through a DVD reader or uploaded via the optional Performance Based Navigation VisionMaster FT GateWay.

The VisionMaster FT ECDIS features disappearing menu bars and menus when not in use, to optimize full-screen viewing of the chart display. The split-screen function (one of five display modes) permits two independent charts to be displayed simultaneously, or for displaying the same navigational picture at different chart scales.

Multiple voyage plans can be created quickly and edited easily at any time during the voyage without interrupting the navigation process. The ECDIS automatically correlates targets with radar and AIS to minimize mistaken identity and simplify watchstanding.



Radar Overlay is an optional configuration that improves accuracy and safety of radar information.

Standard Features

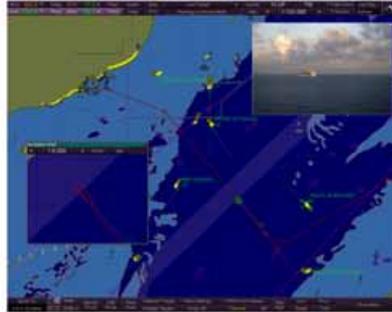
- Vector or raster chart formats
- ARPA and AIS target correlation with all other VisionMaster FT workstations
- Operator configurable screens (full display, vertical or horizontal split screen and picture in picture)
- Navigation tools including parallel index lines, history tracks, and predicted vectors

Sea It Your Way

HORIZONTAL SPLIT SCREEN



PICTURE IN PICTURE



OPTIONAL RADAR OVERLAY

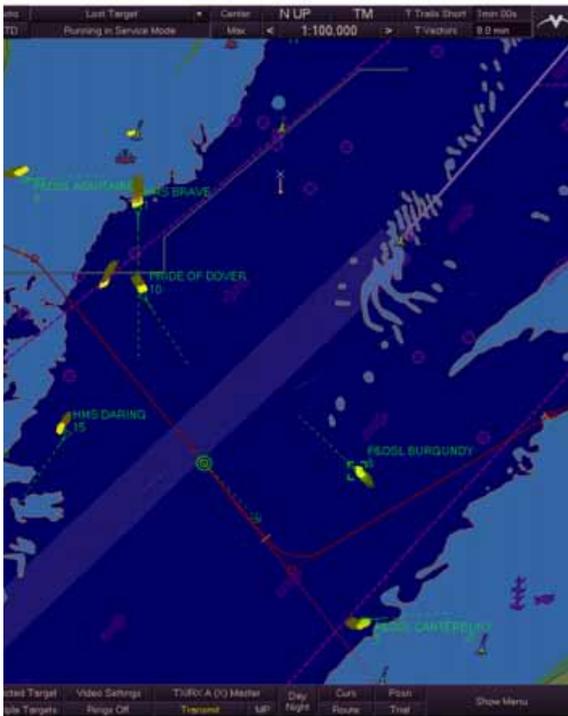
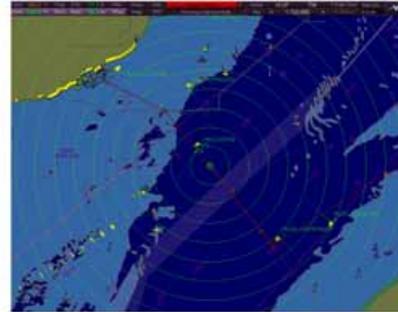


Figure 1 for the ECDIS workstation. With Radar Overlay, the information is added to the electronic chart.

- Depth history graph
- Records of key voyage and alarm information
- EBL and VRM functionality with radar
- Configurable Conning Information Display (CID)
- iUSB portable storage device port
- iHelp functions



The VisionMaster CID shows critical navigation sensor data in a clear, easy-to-read format, and can be integrated with VisionMaster options such as CCTV.

Options

- Track Control complies with IEC62065
- Radar overlay
- Interactive Conning Information Display (CID)
- Joystick and course mode
- Central Alarm Management group and prioritization of alarms
- Speed control
- Fitness and vigilance alarm compliance
- AIS control
- Basic control panel for radar overlay functionality
- Advanced Control Panel
- Performance-Based Navigation for fuel management, electronic chart downloads corrections and ship telematics
- ShipSentry - Shipboard Protection System

VISIONMASTER FT ECDIS

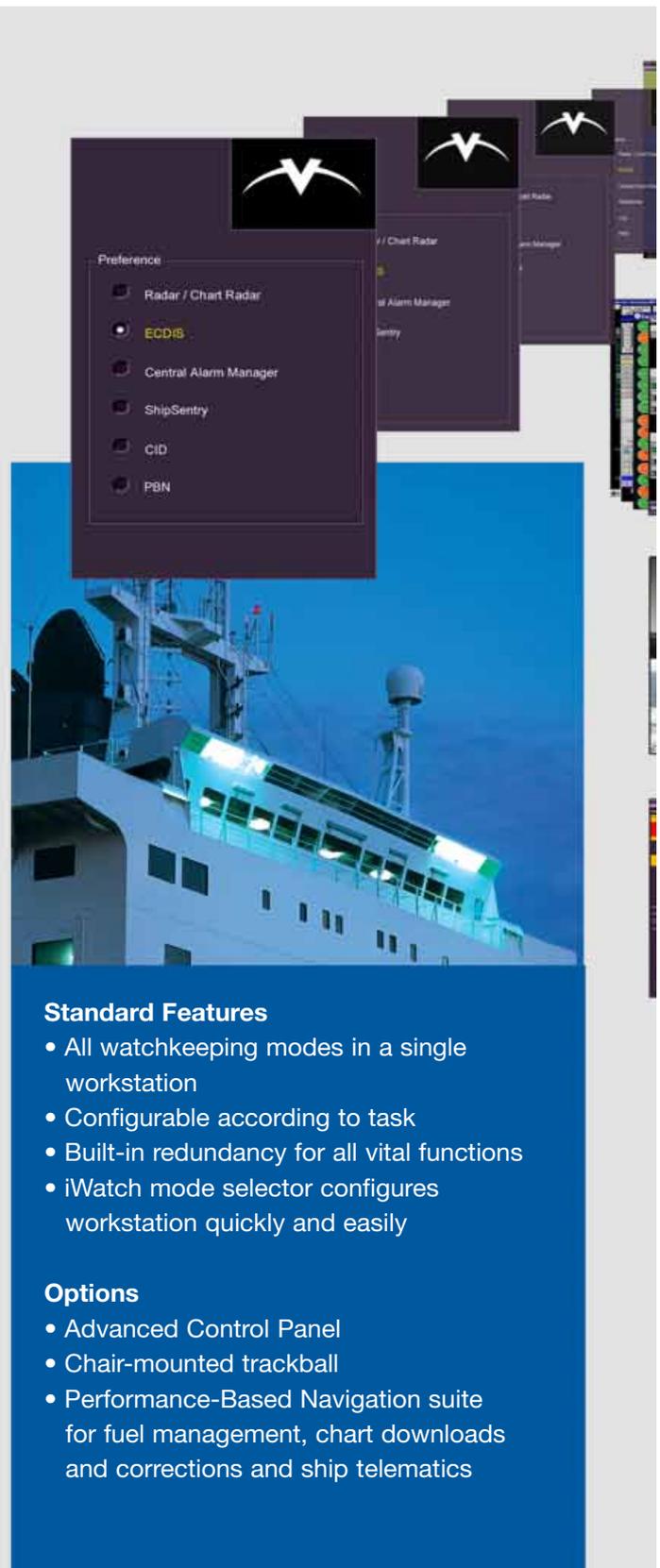
VISIONMASTER FT TOTALWATCH Multi-Function Workstation

The VisionMaster FT TotalWatch multi-function workstation provides the ultimate in flexibility and redundancy for bridge configuration and manning. TotalWatch represents the ultimate in situational awareness for the navigator. At a TotalWatch workstation, any VisionMaster function can be selected by the operator as a Watch Mode, at the click of a button. With TotalWatch:

- Any combination of workstation functions and watchkeeper manning configurations can be created to suit the navigational situation, with optimal configurations to meet the unique requirements of inshore piloting, open sea navigation, docking, and anchoring.
- All navigation data is available to any watchstander at any moment in time, enhancing navigation performance and increasing safety.
- Having multiple functions available at individual workstations provides the redundancy necessary to maximize system availability.
- The flexibility of TotalWatch enables reduced manning, which will result in major cost savings, as well as supporting single-watchkeeper bridge requirements.

Further enhancing performance, with a dual-display TotalWatch configuration and the optional chair-mounted trackball control, a single watchkeeper can control and monitor two VisionMaster watch modes at a single location.

Like all VisionMaster FT systems, TotalWatch workstations are designed to be interfaced with the optional Performance-Based Navigation suite that includes fuel management, chart downloads and corrections and ship telematics.



Standard Features

- All watchkeeping modes in a single workstation
- Configurable according to task
- Built-in redundancy for all vital functions
- iWatch mode selector configures workstation quickly and easily

Options

- Advanced Control Panel
- Chair-mounted trackball
- Performance-Based Navigation suite for fuel management, chart downloads and corrections and ship telematics

Sea It Your Way

ECDIS
(Electronic Chart Display & Information System)

Radar

ChartRadar

ShipSentry
(Shipboard Protection System)

PBN
(Performance-Based Navigation)

CID
(Conning Information Display)

Machinery Automation

Other Applications

Closed Circuit Television

Central Alarm Management

VISIONMASTER FT TOTALWATCH

VISIONMASTER FT TOTALWATCH SYSTEMS

VisionMaster FT TotalWatch is a true multi-function workstation that has a complete fusion of navigation technologies in one console. TotalWatch allows simultaneous applications to be executed on one workstation with easy switching between them.

All VisionMaster FT watchkeeping modes can be displayed - Radar, ChartRadar, CID, ECDIS, and ECDIS with Radar Overlay. And other shipboard systems such as machinery automation, central alarm management, ShipSentry (Shipboard Protection System), Performance Based Navigation modules and CCTV can be monitored.



VISIONMASTER FT INTEGRATED BRIDGE SYSTEMS

Sperry Marine offers VisionMaster-based Integrated Bridge Systems (IBS) to meet the certification requirements of all major international organizations, standards, and notations. Sperry Marine IBS designs are proven for both commercial and military applications, and are scalable for all types of vessels. In Sperry Marine's modular IBS design architecture, any combination of VisionMaster FT radars, chart radars, ECDIS, and/or TotalWatch can be integrated to provide an efficient bridge design for any vessel and platform.

Sperry Marine's latest generation of bridge consoles offers the ultimate in ergonomic design for ease of operation and maintenance. Sperry Marine IBS designs provide ease of integration with all of our navigation product lines, such as our NAVIPILOT Adaptive Heading Control Systems, VoyageMaster Voyage Data Recorders, and our Inertial Navigation Systems, Gyrocompasses and Speed Logs.

Benefits

- Safe and efficient vessel operation enhanced via uniform presentation of menus and screens across all functional modes
- Uniform PC platform minimizes training time and contributes to vessel operating efficiency
- Interactive Conning Information Display offers faster response to situations enhancing safety margins
- Built-in system redundancy reduces equipment downtime

Flexibility and Innovation

The modular console design and uniform PC platform structure of the VisionMaster FT translate to complete control in IBS design for the customer.

Information from all navigation sensors is brought together and merged into a functional workstation – designed with improved ergonomics and service access. The VisionMaster FT IBS meets the customer's needs of today and tomorrow with ease and efficiency.

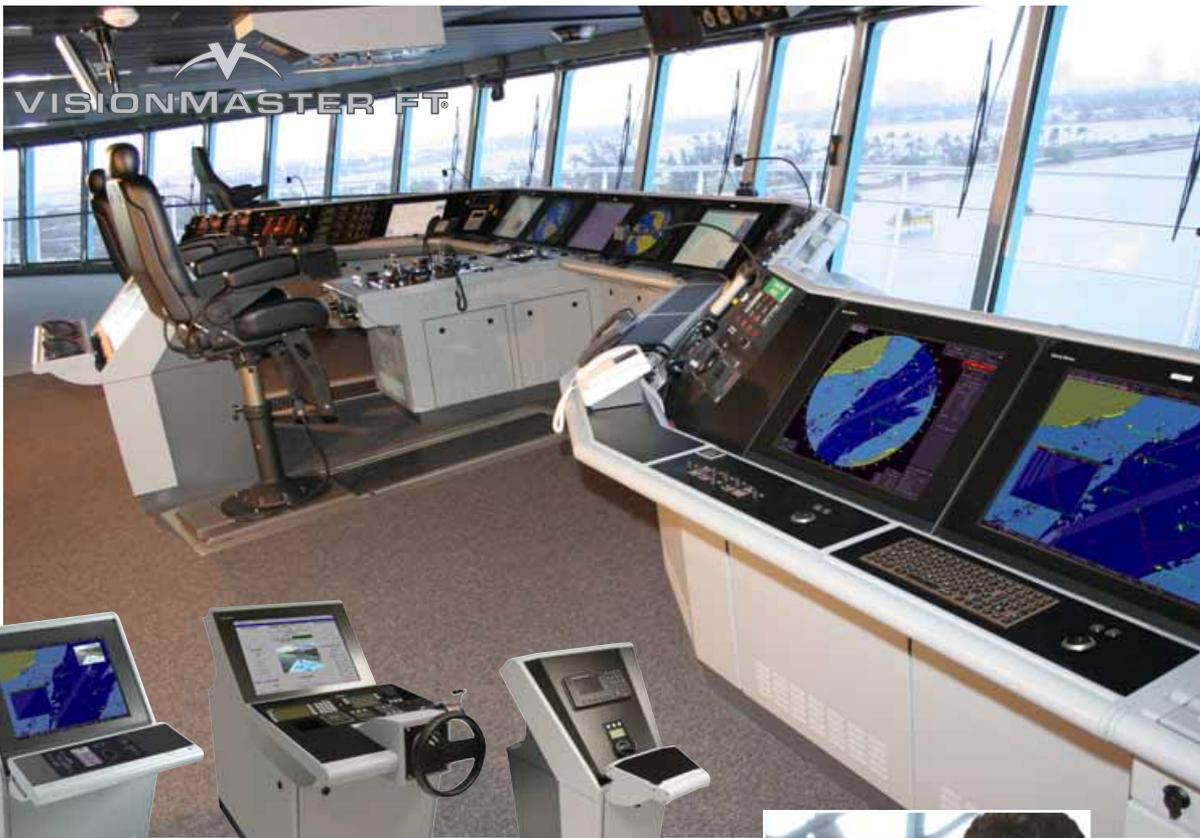
Services

- Project Management
- Console Design
- Systems Engineering
- Acceptance Testing
- Sea Trials
- Commissioning





Sea It Your Way



Steering Stand

Corner



VISIONMASTER FT INTEGRATED BRIDGE SYSTEMS

VISIONMASTER FT Performance-Based Navigation

All VisionMaster FT products work seamlessly with Sperry Marine's Performance-Based Navigation (PBN) suite, taking advantage of existing and future satellite connectivity. Connectivity is enabled using a VisionMaster FT Enterprise Gateway, a source for secure data communications between the shipboard systems and shore users. The PBN suite provides shore personnel a real-time and effective asset management capability. Shore users employ an innovative and powerful web-based **BridgeLink** asset management and decision support application.

Fuel Navigator

- Improves ship's performance through active fuel management
- Highly accurate weather and ocean current service serves as a key input for performance optimization
- Real-time interactive weather and ocean currents routing
- Optimization of routes, speed and engine modes
- Reduced fuel costs through optimized routing
- Built-in ship hull and engine modeling for optimizing performance
- Decision support tools for master and shoreside managers
- Interfaces to ship engine automation system
- Fuel savings translates to reduced CO₂ emissions
- **BridgeLink** web-based asset management and decision support portal

ActiveChart

- Real-time digital chart and corrections upload to ship
- Automatic interface with ECDIS
- Improved management of digital chart inventory
- Ensures safe navigation in compliance with regulatory requirements
- **BridgeLink** web-based asset management and decision support portal

Ship Telematics

- System status and performance reporting
- Diagnostics and repair
- Online technical support
- Product and software upgrades uploaded to ship
- **BridgeLink** web-based asset management and decision support portal



Sea It Your Way



Through **BridgeLink**, a web-based asset management and decision support portal, shipboard operations are readily reviewed by the shoreside team.



Asset Management Delivered

VISIONMASTER FT PERFORMANCE-BASED NAVIGATION

Sperry Marine's Worldwide Service Network provides...

prompt shipboard maintenance and repair services in every major seaport in the world -- 24 hours a day, 365 days a year, minimizing equipment downtime and in-port turnaround times. Our marine service engineers are continually trained in the latest procedures for maintenance, troubleshooting and repair of navigation and communications equipment. Our comprehensive network of parts distribution centers, service depots, repair workshops and centralized dispatch centers is unmatched in the maritime industry.



ServiceNet Solutions to Keep Your Fleet Sailing

ServiceNet's unique web-based interface makes it possible for shipowners, masters, service agents and Sperry Marine factory engineers to communicate interactively across thousands of miles and different time zones to organize and manage service issues in a timely manner. The result is a seamless information exchange system that empowers shipowners to manage more efficiently the repair and upkeep of their ships at sea.



The Clear Advantage

The ServiceNet web interface manages all aspects of service and spares management.

- Service ordered and verified immediately.
- Service calls dispatched rapidly.
- Progress reports on the status of a service call or spare parts order available instantly around the clock.
- Better availability of service personnel and spare parts at ship's arrival.
- Equipment repairs completed accurately the first time.
- Spare parts ordered online.
- Service information accessed from Internet.
- Administration costs lowered.

ServiceNet Options

Sperry Marine offers a flexible range of ServiceNet options, to suit the shipowner's unique service requirements. Options include:

- Fleetwide ServiceNet support including operator training, planned maintenance, spares management, Internet subscription and technical support from dedicated liaison engineer.
- Fixed-price coverage of all navigation and communication systems, regardless of the equipment's manufacturer.
- Fixed-price management fee with support and reporting, with additional charges for on-board service.
- Time and material for all service calls.
- Any combination of the above to suit customer requirements.

Sea It Your Way



Training options include:

- Courses at Sperry Marine training centers in **Charlottesville Virginia, USA or New Malden, UK, or Hamburg, Germany** with a combination of classroom and simulator training.
- Mobile training workstations
- Technical training on board for first-line service and repair
- Shipboard operator training while underway
- Supplemental computer-based training (CBT) using CD-based programs or via Internet connections using the ServiceNet interface

VISIONMASTER FT WORLDWIDE SERVICE

Training Programs

A key element in Sperry Marine's approach to customer service is training -- to keep modern navigation and communication systems working at peak efficiency and avoid expensive downtime.

Sperry Marine offers a broad range of training programs for bridge officers and electronics maintenance officers, including classroom instruction, shipboard hands-on training and computer-based self-instruction.

Sperry Marine's training centers in the United States, United Kingdom and Germany are equipped with full integrated bridge system simulators and networked classrooms with individual computer workstations. The ECDIS training curriculum, which is taught by certified instructors, follows IMO Model Course 127 and is approved by the U.S. Coast Guard. STCW-95 certificates of achievement are issued to participants on completion.



Hardware Technical Specifications

340 VISIONMASTER Deckstand

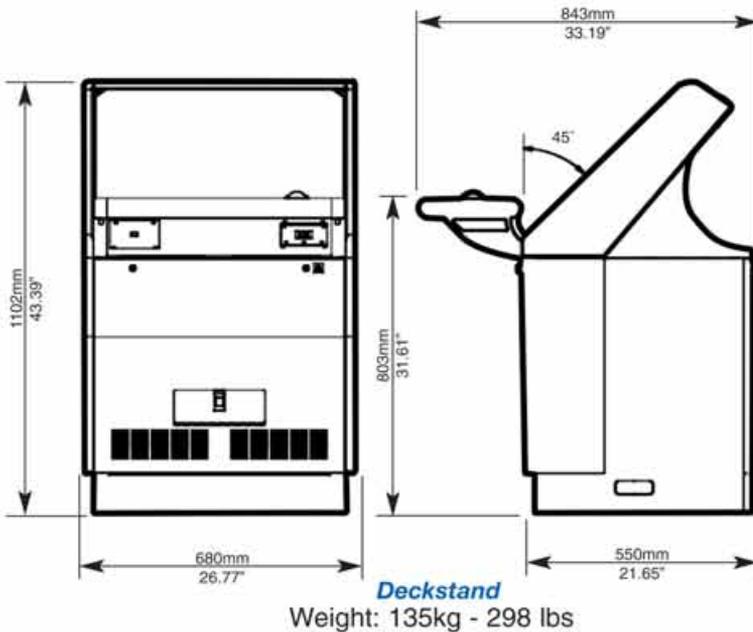
Product Types	ARPA, Chart Radar
Monitor Type	Flat Panel LCD
Radar video circle diameter	340mm - (13.4")
Screen Size	586.7mm - (23.1")
Resolution	1280 x 1024
Contrast ratio	600:1 Typical
Light Intensity	250 cd/m ² Typical
Power Supply Input	AC 92-276V, 47 - 64Hz
Consumption	250W max.
Human Interface	Trackball
Storage Media:	Hard Disk & USB Memory Stick
Other features:	RGB Output for VDR or secondary monitor
Environmental Specifications	IEC60945
Compass Safe Distance	Standard 2.9m, Steering 1.9m



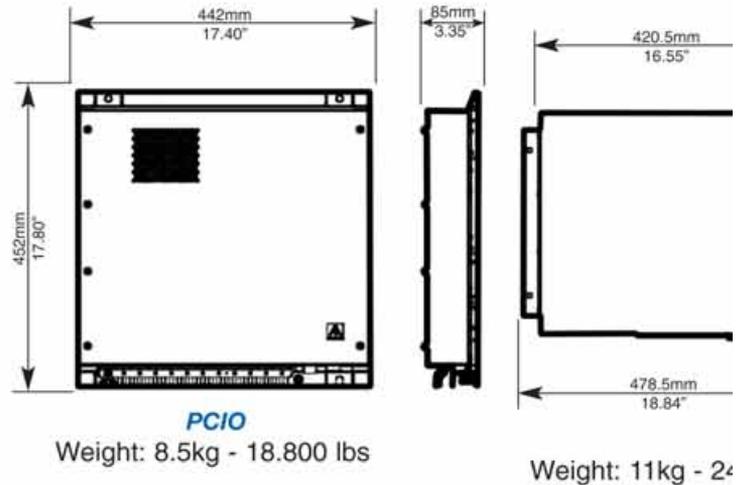
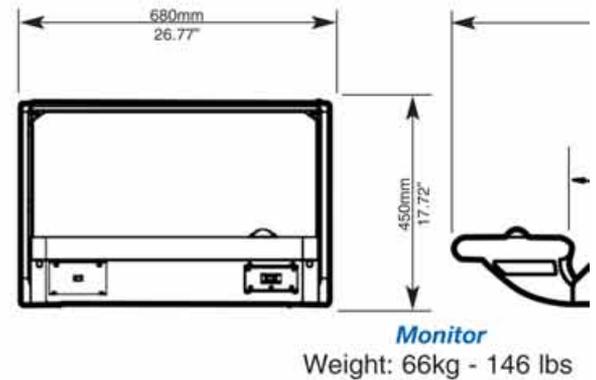
340 VISIONMASTER Desktop

Product Types	ARPA, Chart Radar
Monitor Type	Flat Panel LCD
Radar video circle diameter	340mm - (13.4")
Screen Size	586.7mm - (23.1")
Resolution	1280 x 1024
Contrast ratio	600:1 Typical
Light Intensity	250 cd/m ² Typical
Power Supply Input	AC 92-276V, 47 - 64Hz
Consumption	250W max.
Human Interface	Trackball
Storage Media:	Hard Disk & USB Memory Stick
Other features:	RGB Output for VDR or secondary monitor
Environmental Specifications	IEC60945

Weights and Dimensions



Weights and Dimensions



Sea It Your Way



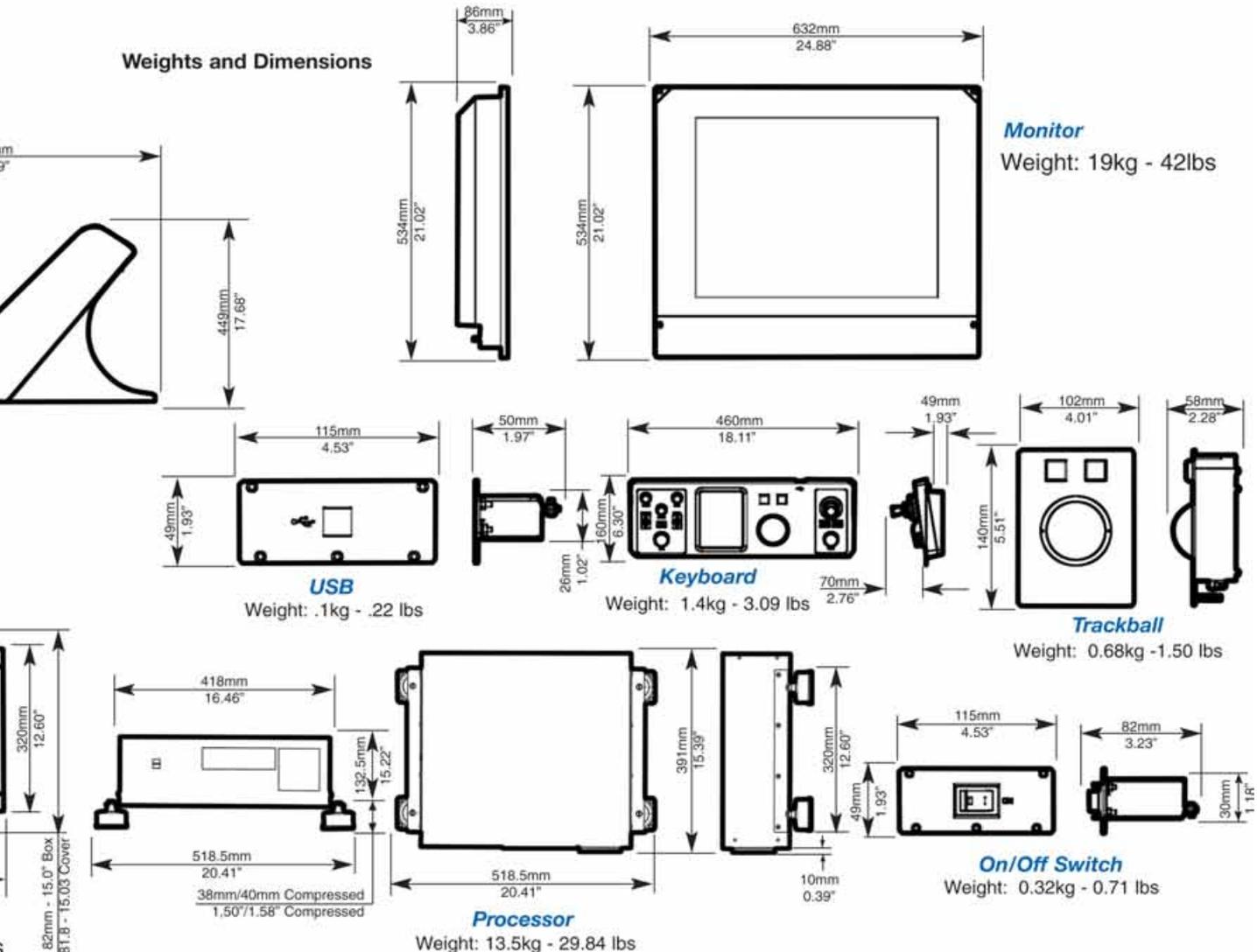
340 VISIONMASTER Kit (23" flat panel)

Product Types	ARPA, Chart Radar
Monitor Type	Flat Panel LCD
Radar video circle diameter	340mm - (13.4")
Screen Size	586.7mm - (23.1")
Resolution	1280 x 1024
Contrast ratio	600:1 Typical
Light Intensity	250 cd/m ² Typical
Power Supply Input	AC 92-276V, 47 - 64Hz
Consumption	250W max.
Human Interface	Trackball
Storage Media:	Hard Disk & USB Memory Stick
Other features:	RGB Output for VDR or secondary monitor
Environmental Specifications	IEC60945



VISIONMASTER FT SPECIFICATION

Weights and Dimensions



Sperry Marine

For more information, please contact:

AMERICAS

Charlottesville, VA USA

Tel: +1 434-974-2000

Fax: +1 434-974-2259

Melville, NY USA

Tel: +1 631-719-4736

Fax: +1 631-719-4630

ASIA

China, Shanghai

Tel: +86-21-5836-9978

Fax: +86-21-5836-9979

Hong Kong, Sheung Wan

Tel: +852-2581-9122

Fax: +852-2581-9967

Japan, Tokyo

Ph: +81 (0)-3-3863-7401

Fax: +81 (0)-3-3863-7455

Singapore

Tel: +65-6274-3332

Fax: +65-6271-3339

South Korea, Busan

Tel: +82-51-247-7455

Fax: +82-51-247-7454

Taiwan, Kaohsiung

Tel: +886-7-331-7786

Fax: +886-7-331-7924

CANADA

Nova Scotia, Halifax

Tel: +1 902-468-9479

Fax: +1 902-468-9480

EUROPE

Belgium, Antwerp

Tel: +32-3-233-14-33

Fax: +32-3-225-05-53

Denmark, Copenhagen

Tel: +45-77-33-66-33

Fax: +45-77-33-66-11

Germany, Hamburg

Tel: +49 (0)40 299 00-0

Fax: +49 (0)40 299 00-146

Holland, Vlaardingen

Tel: +31(0)-10-4451600

Fax: +31(0)-10-4345015

Norway, Bergen

Tel: +47-55-94-94-94

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

United Kingdom, New Malden

Tel: +44(0)20 8329 2000

Fax: +44(0)20 8329 2415

Sperry Marine Online - www.sperrymarine.northropgrumman.com



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 - Products
 - Type Approvals
 - Press Releases
 - Suppliers
- Customer Login Portal for relevant & exclusive information
- Customer Support
 - Service Online
 - Customer Feedback
- Events & Trade Shows
- Employment Opportunities
- Links to the Northrop Grumman Website
- Home Page Site Search Capabilities

Sperry Marine, with worldwide headquarters in Charlottesville, VA, USA and major engineering and support offices in Melville, NY, USA, New Malden, England and Hamburg, Germany, is part of the Northrop Grumman **Electronic Systems** sector.

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