# MULTIFUNCTION BY DESIGN

## MANTADIGITAL ECDIS

SITUATIONAL INTELLIGENCE, THE WORLD OVER

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marine systems

# Introduction

## Features

ECDIS is an acronym for Electronic Chart Display and Information System. At its simplest, an ECDIS consists of a database of electronic charts, together with the hardware and software needed to display simultaneously the charts and the ship's own position (obtained from a GPS or another positioning sensor), and to perform navigational tasks such as route planning, route monitoring, measurement of distances on the chart, etc. One of the most important features of ECDIS that makes it a unique aid to navigation is the capability of generating alarms (anti-grounding, off route, etc.), based on input from sensors and analysis of chart information.

Kelvin Hughes was one of the first Companies to receive Type Approval for its ECDIS back in 1994. Since then many advances have been made in technology and data availability. World-wide ENC (vector) chart data is now available from a variety of sources.

## Kelvin Hughes - A History of Innovation

*Kelvin Hughes is a world leader in the design and supply of marine navigation and surveillance systems. It has a highly innovative product range, which is designed to provide the most advanced navigation solutions and services available. Products include Radar sensors and display technology, voyage data recorders, electronic chart displays and highly advanced integrated bridge systems. In addition, through ChartCo, it provides a unique means of data supply to ships at sea via satellite, email or internet. Kelvin Hughes is also the world's largest supplier of nautical charts and publications for commercial and leisure use.*

*Kelvin Hughes has its headquarters in East London, and subsidiary offices in other parts of the UK, Denmark, The Netherlands, Norway, Singapore, USA, Hong Kong and China. With this global presence, Kelvin Hughes provides a first-class sales and support capability for customers world-wide.*

## ECDIS Mandation Timescale

**SOLAS regulation V/19 requires ships engaged on international voyages to be fitted with ECDIS as follows:**

- **Passenger ships over 500 GRT constructed on or after 1 July 2012;**
- **Tankers over 3,000 GRT constructed on or after 1 July 2012;**
- **Cargo ships, other than tankers, over 10,000 GRT constructed on or after 1 July 2013;**
- **Cargo ships, other than tankers, over 3,000 GRT but less than 10,000 GRT constructed on or after 1 July 2014;**
- **Passenger ships over 500 GRT constructed before 1 July 2012, not later than the first survey on or after 1 July 2014;**
- **Tankers over 3,000 GRT constructed before 1 July 2012, not later than the first survey on or after 1 July 2015;**
- **Cargo ships, other than tankers, over 50,000 GRT constructed before 1 July 2013, not later than the first survey on or after 1 July 2016;**
- **Cargo ships, other than tankers, over 20,000 GRT but less than 50,000 GRT constructed before 1 July 2013, not later than the first survey on or after 1 July 2017;**
- **Cargo ships, other than tankers, over 10,000 GRT but less than 20,000 GRT constructed before 1 July 2013, not later than the first survey on or after 1 July 2018.**

## Questions KELVIN HUGHES can answer for you

- **What ECDIS hardware do I need ?**
- **What's the most cost-effective chart data solution for my ships ?**
- **How can I keep my chart data up-to-date ?**
- **Where can I get officially recognised and approved training for my crews ?**
- **If I still need paper charts, which must I carry ?**
- **Chart coverage keeps changing - who can manage this for me ?**
- **Managing my chart outfit is a real burden who can I trust to do it for me ?**
- **What do I need as an ECDIS backup ?**
- **Who can provide global installation and support for my vessels ?**

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ADMIRALTY
INTERNATIONAL CHART AGENT

ChartCo

# MANTADIGITAL™

## MantaDigital™ Philosophy

Designed for ease of operation MantaDigital™ ECDIS is the latest product from Kelvin Hughes' Manta development programme. Intuitive operation and a clear display of relevant information provides the operator with a decision making tool which enhances safety and efficiency. Simplicity and ease of operation is at the heart of Kelvin Hughes' design philosophy.

## Multi-Function by Design

From the outset, MantaDigital™ ECDIS has been designed for true multi-functionality, providing a platform for Radar, Chart Radar, ECDIS and Conning Display options. MantaDigital™ is driven by Kelvin Hughes' "common-core" processor system which is now in use throughout the Radar, ECDIS and VDR product ranges providing enhanced functionality, reliability and low cost of ownership.

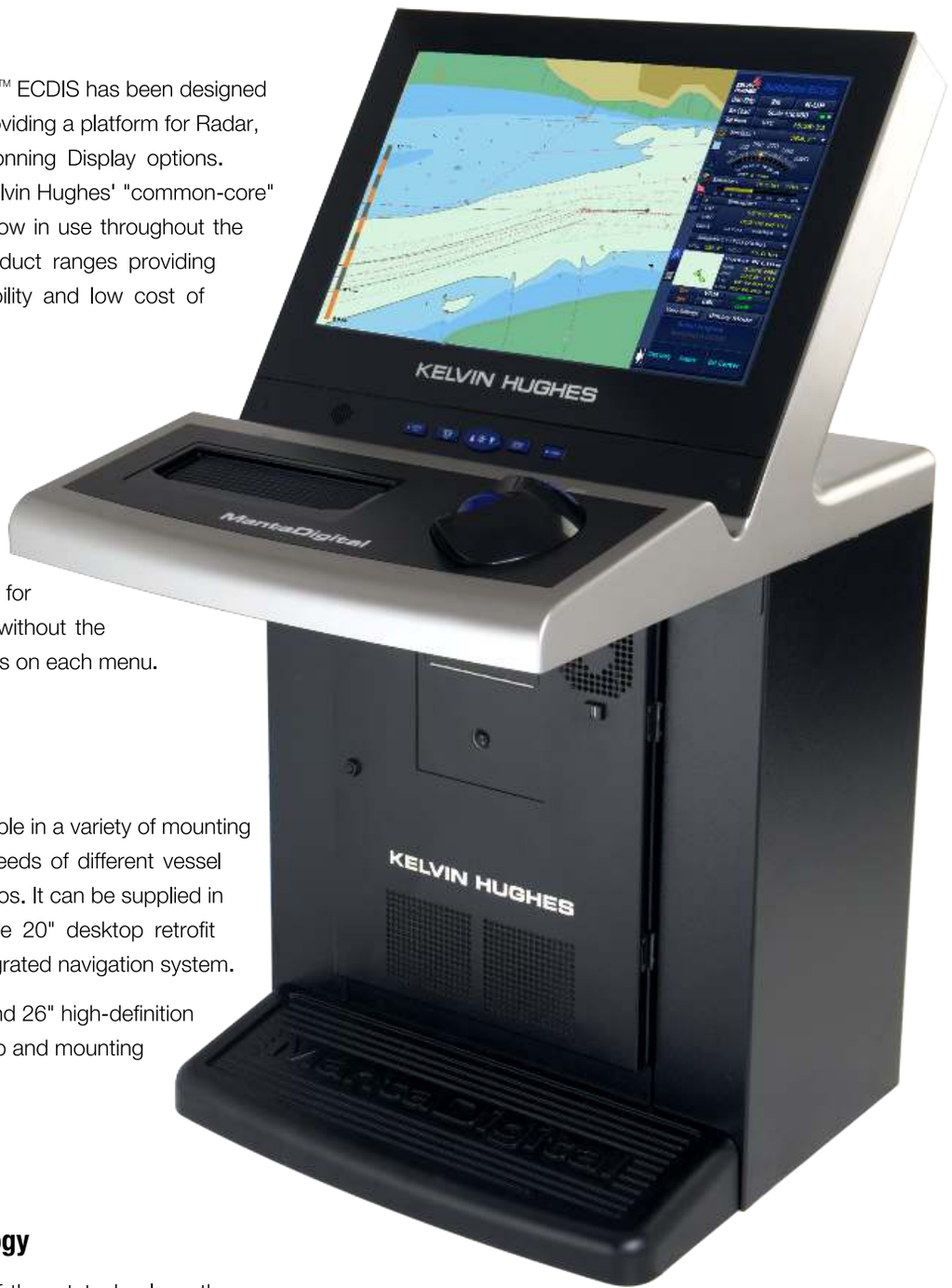
## Simplicity of Operation

The user interface has been designed to be intuitive to operate and provide all the tools that the navigator needs for efficient and safe navigation without the need to explore multiple levels on each menu.

## The Range

MantaDigital™ ECDIS is available in a variety of mounting configurations to meet the needs of different vessel types and operational scenarios. It can be supplied in options ranging from a single 20" desktop retrofit system through to a fully integrated navigation system.

Display options include 20" and 26" high-definition screens for pedestal, desktop and mounting into consoles.




**MantaDigital ™ 26" Pedestal ECDIS**

## State-of-the-Art Technology

Employing the latest state-of-the-art technology the MantaDigital™ ECDIS offers a vast array of advantages to the navigator, from immediate situation awareness, through to sophisticated alarm management. The MantaDigital™ ECDIS uses the same three button and trackerball interface concept that has been used successfully in Kelvin Hughes' products for over 10 years.

## Network Functionality

A high-speed LAN connection provides distribution of route data and interfacing with the ChartCo update service.

# MANTADIGITAL™ ECDIS Features

## Situation Awareness

MantaDigital™ ECDIS provides a continuous display of ownship's navigation parameters together with a display of ownship graphic with heading, track, and route on the chart.


**MantaDigital™ 26" Desktop ECDIS**

## Route Monitoring

MantaDigital™ ECDIS provides continuous monitoring of vessel's position against its planned track. In addition, a look ahead is performed on the underlying chart data and a warning is generated if the intended vessel's track will violate pre-set safety parameters.

## Navigation Tools

MantaDigital™ ECDIS provides a range of tools to ease the task of electronic navigation. These include range and bearing cursors, an enlarged "spyscope" together with traditional tools for route planning. Included in these tools is manual fixing which can be used both as a training tool and operationally in the event of a sensor failure. This enables the navigator to fix the vessel's position on the electronic chart using traditional radar or visual plots and fixes. These manual fixes can be used to derive dead reckoned or estimated positions for ongoing navigation.

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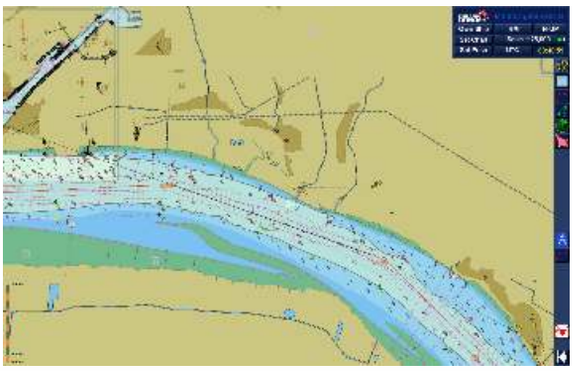
# MANTADIGITAL™ ECDIS Features

## Maximised Chart

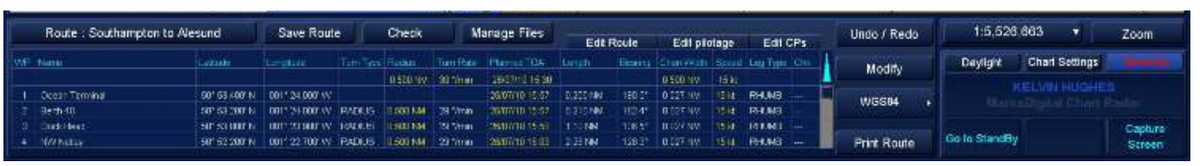
A single toggle action provides a maximised chart display enabling more of the chart to be displayed. A simple menu system allows the user to select the functional panels.



## Route Planning

Routes can be planned using drag-and-drop to define the waypoints on the chart screen. Channel widths, turn radius and planned speeds for each leg can be defined. After planning, the route can be checked to see whether it violates the ships safery parameters, this must be done before the route can be activated. Both rhumb line and great circle legs can be constructed.

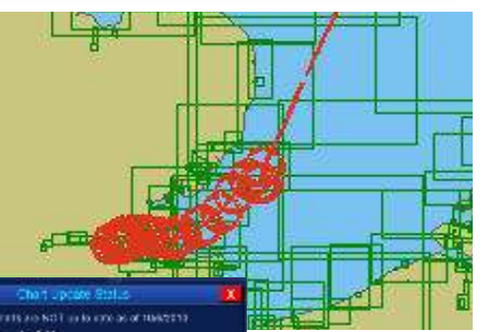
Tools for traditional planning are also provided enabling the navigator to setup clearing ranges and bearings for each leg of a route. These are transferred to the Radar when on passage.

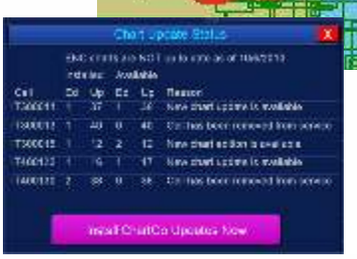



## Chart Maintenance

Extensive tools are provided which simplify the orgainsation and management of chart data and permits. In conjunction with the ChartCo update service the MantaDigital™ ECDIS is the easy solution for chart management and updates onboard your vessels.

In conjunction with the ChartCo update service, the status of all cells can be automatically displayed and any required updates applied.

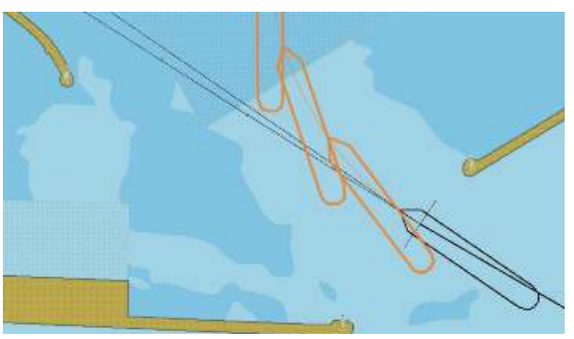





## Vessel Position Prediction

To aid close quarter manoeuvering on large chart scales , the ECDIS will display the outline of the vessel graphically on the chart based on preset parameters.

A forward prediction of ownship's position up to 6 minutes advanced can also be displayed to give the navigator awareness of the vessel's position during the manoeuvre.



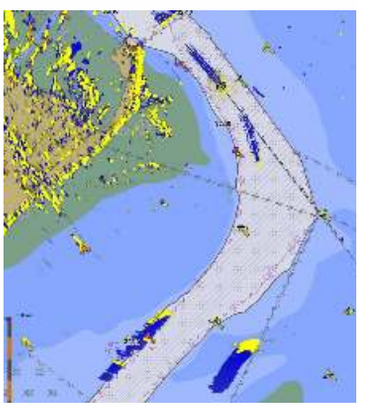
# MANTADIGITAL™ ECDIS Features

## Alarm Functionality

MantaDigital™ ECDIS includes an integrated alarm management system which alerts the navigator if safety parameters are contravened or if there is a failure of any ancilliary system. Alarms and warnings can also be transferred to officers' cabins or to the general alarm system.


## Radar Interlay (Option)

As an aid to situation awareness the MantaDigital™ ECDIS can interlay radar data with the ENC chart data. This provides the navigator with instant appreciation of the current navigation situation with regard to collision and possible grounding. It also provides a excellent check on the status of position fixing aids as radar visible coastlines can be easily matched to the chart data to give an immediate integrity check.



## Track Control (Option)

With an optional software module MantaDigital™ ECDIS can provide fully Type Approved Track Control functionality meeting the requirements of IEC62065. In this mode the autopilot receives steering instructions from the ECDIS and performs the steering in accordance with the preset parameters in the ECDIS.

The ECDIS can also transfer the data to the radar to allow the display of curved heading line, which is a feature that shows the turn to be performed by the vessel on the radar. This way the navigator can predict the turn circle and determine if the turn is in accordance with his intentions.


## Conning Display (Option)

The Conning Display option provides a centralised real-time display of navigation parameters. These include heading track and speed together with planned routes and monitoring data. A head-up inset chart is displayed together with a depth graphic. This mode can be configured to suit a ship's individual sensors and parameters and can be used as an ECDIS backup.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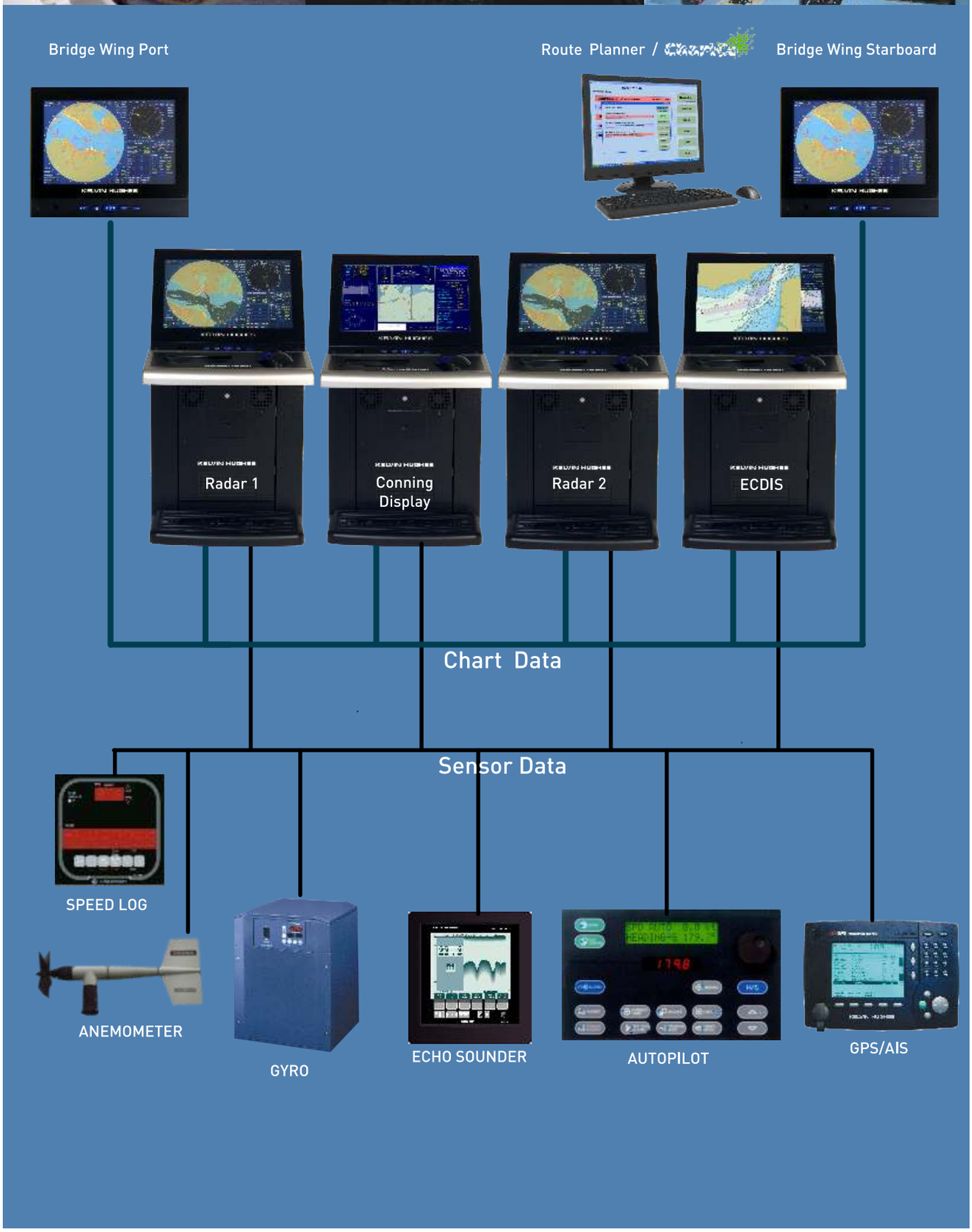
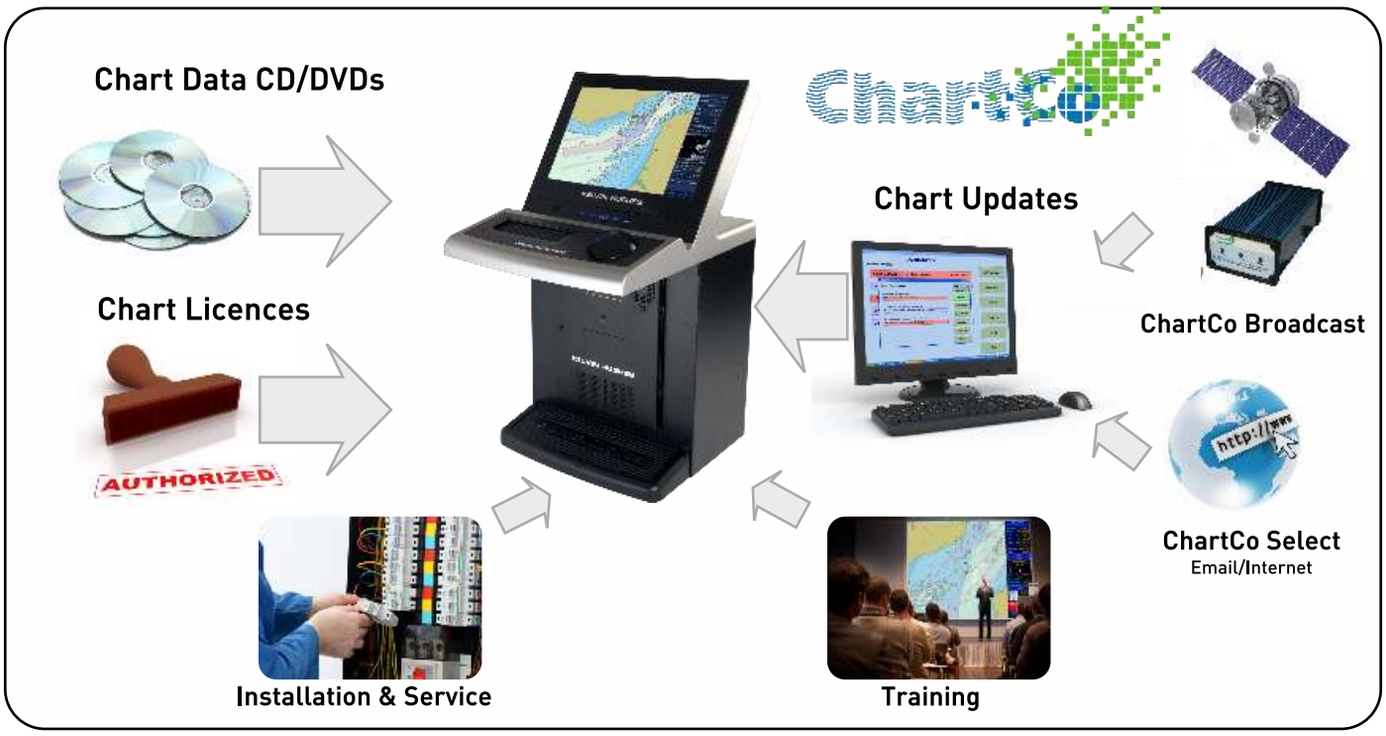
# Typical Bridge Data Network



# ECDIS$^{plus}$ Kelvin Hughes' Total ECDIS Solution




## What is ECDIS$^{plus}$ ?

ECDIS$^{plus}$ is a unique package from Kelvin Hughes which provides a "turn-key" ECDIS solution. It includes hardware supply and installation, initial chart data supply, licence management, ChartCo updates and an IMO approved training package, all backed up with support from Kelvin Hughes' global service network. ECDIS$^{plus}$ can be tailored to individual customers' requirements and can range from the supply of ECDIS hardware through to a complete package. Paper charts and digital licences can also be managed and replenished under the Outfit Management Service (OMS)

## Installation Service

Whether for a new-build integrated bridge or a retrofit stand-alone, Kelvin Hughes is able to offer a complete installation and commissioning service world-wide.

As part of ECDIS$^{plus}$ several standard packages are available, these can cover anything from commissioning only through to a complete install with cable laying, physical mounting of the hardware, commissioning and disposal of any redundant equipment. These installation packages are available at global locations and at fixed pre-agreed prices.

## Equipment

The wide-screen MantaDigital™ ECDIS forms the core of ECDIS$^{plus}$. This is available as a desktop, pedestal or console mounted system with screen sizes of 22" or 26". The main user interface is the tracker ball and three buttons which may optionally be mounted remotely. An optional standard QWERTY keyboard can also be provided.

## Chart Data

Chart data is the key component of any ECDIS system. To be an official ECDIS this has to be vector based ENC issued by a national hydrographic authority. ECDIS$^{plus}$ can be supplied with any official ENC chart data such as AVCS or PRIMAR. In addition, in ECS mode non-official chart data can be displayed. The choice of suppliers will depend very much on the operating area of the vessel, Kelvin Hughes can make this choice for you to give you the most cost effective and safe coverage.

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# ECDIS$^{plus}$ Kelvin Hughes' Total ECDIS Solution

## Licence Management

Managing electronic charts differs significantly from paper charts. Chart cells are loaded onto the ECDIS and activated using licences. Licences from different hydrographic offices may have differing validity durations, so ensuring that the appropriate charts remain available is an important task. Ships whose trading patterns change will need new cells to be activated. Licences are available for three, six or twelve month durations. Kelvin Hughes can remotely manage the licensing process as part of the Outfit Management Service.

## Data Updates

Managing changes to the chart database is key to keeping the chart outfit up-to-date and safe and meeting the Port State Authority requirements. ChartCo provides an update via broadcast, email or Internet technology. This service provides updates for paper and electronic charts and publications and includes additional services such as weather forecasting and routing and a news service. Updates can be passed directly to the ECDIS through the network or via CD.

In addition Kelvin Hughes' Outfit Management service can manage paper publications and charts alongside your digital data ensuring that at all times you are up-to-date, safe and meet the port state authority requirements.

## ECDIS Backup and Flag Approvals

The requirements for ECDIS backup differ significantly across Flag States. As part of ECDIS$^{plus}$ Kelvin Hughes will advise on the requirements relating to individual vessels and will provide and manage any "get-you-home" paper charts that may be required. Whatever the backup requirements Kelvin Hughes will deliver and manage a least cost solution ensuring that at all times the vessel's data is up to date.

## Training

Kelvin Hughes provides a Flag State approved course based on the IMO 1.27 model. This course teaches the navigator to get the most out of their equipment and particularly familiarises the user with using traditional navigational methods on the ECDIS.

The overall objective is to enhance navigational safety through safe operation and a thorough understand of the MantaDigital™ ECDIS.

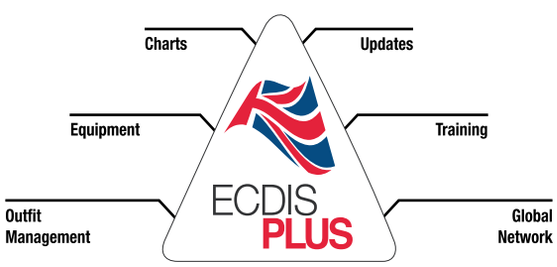
Key areas addressed by the course are:

- Electronic chart data and its display in an ECDIS
- Proper use of the ECDIS equipment
- ECDIS-related limitations
- Operation of the Kelvin Hughes ECDIS

The training lasts five days and is available in the UK (South) , Egypt and Singapore.

## Warranty and Global Service

Through its service locations and a large number of authorised service partners Kelvin Hughes can provide global service and support. Standard and extended warranties are available for all equipment sales.




**"the complete picture..."**

# MANTADIGITAL™ ECDIS Specifications

## Screen

| | | | |
|---|---|---|---|
| **Display Type** | **Flat Panel TFT** | **Screen Sizes** | **26" (660mm) and 22" (560mm) diagonal active size** |
| **Pixel Resolution** | **1920 x 1200** | **Aspect Ratio** | **16:10** |
| **Display Variants** | **Pedestal, Desktop, Console and Bridge-Wing (Internal)** | | |

## Chart Formats

| | |
|---|---|
| **AVCS** | The Admiralty Vector Chart Service (AVCS) brings together Electronic Navigational Charts (ENCs) from national Hydrographic offices around the world and new ENC coverage produced by UKHO in co-operation with Foreign Governments to provide comprehensive, official, global coverage. |
| **Jeppesen Primar ENC Service** | The Jeppesen Primar ENC Service provides a single data source that ensures that mariners are always navigating with an approved ENC where available. Unofficial data produced by Jeppesen will be used where no official coverage is available. |
| **C-MAP** | Unofficial vector chart data with world-wide coverage |

## Chart Updates

| | |
|---|---|
| ChartCo | Updating of charts is a simple point and click process and has been designed to facilitate the input of updates from the ChartCo service. |

## Features

Wide-screen flat panel TFT display, less weight, less volume, sharper picture and easier to mount

Extensive route planning and monitoring facilities inc alternate route

| | | | |
|---|---|---|---|
| ARPA display | Displays up to 50 ARPA target graphics and numerical data | AIS Interface | The system can interface with any AIS and display up to 50 active targets |
| Route Verification | Post planning tool to check route before activation | Vessel Prediction | Graphical prediction of vessel's future position up to 6 minutes ahead |
| Route Monitoring | Continuous monitoring of vessel position with respect to planned route | Manual Fixing | Astro, Radar, Visual and electronic fixing methods |
| Track Replay | The vessel's track is automatically recorded and can be saved externally. | User mapping | Allows navigator to add graphical annotation to the chart |
| Range & Bearing Markers | Variable range marker. Electronic bearing lines and parallel index markers provided | Event Recording | User events such as man overboard, can be annotated on the chart |

## Options

| | | | |
|---|---|---|---|
| Radar Interlay | Diplay of radar returns "interlayed" with the chart data | Track Control | Automatic control of the autopilot to maintain the vessel on the planned track |
| Remote Keyboard/ Trackerball | Desktop or built-in options available | Chair-mounted "Ergopod" | Left and right-handed control options for chair attachment |

## Interfaces

| | | | |
|---|---|---|---|
| NMEA-0183 | Log, Gyro, GPS, AIS, Autopilot | Analogue | Gyro, Log, VDR, Rudder Angle |
| Network | CAT5 Ethernet | | |

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# Kelvin Hughes WORLD SERVICE

## Installation and After Sales Service

We recognise that delivering a first-time-fix and value for money are fundamental expectations of our customers.

Key to meeting these expectations is a philosophy of working in partnership with our customers and suppliers centred around a global team of experienced service engineers and support staff who are all passionate about delivering service excellence to the marine industry.

In applying this approach a shared set of values has emerged that defines the way that we aim to work with our customers, our service suppliers and within our own organisation, these being to:

- Ensure that the customer is central to everything that we do.
- Apply mutual trust, fairness and honesty in all of our business dealings.
- Strive to exceed customer expectations, on time and right first time.
- Provide value for money, good quality and maintain vessel safety.
- Continue to improve the service offerings through process improvements and innovation.
- Adapt quickly to changing customer needs.

**What We Offer**

- Spare Parts Sales
- Global Service
- Warranty Support
- Installation and Commissioning Services
- Management / Maintenance Contracts
- VDR Annual Performance Testing
- VDR Replay Services
- Compass Adjusting and Repair
- Operator Equipment Familiarisation and Training
- Equipment Surveys and Inspection
- Technical Advice
- Major retrofit project management
- V-Sat Airtime Contracts


These values and capabilities drive the entire customer experience and are at the heart of what we do 24 hours every day, 365 days a year.

For further information about any of our services please call us on +44 20 8498 1761,

email us at world-service@kelvinhughes.co.uk

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